

**North Carolina
State Bureau of Investigation
State Crime Laboratory
EVIDENCE GUIDE**



North Carolina State Crime Laboratory
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This guide may be duplicated and distributed to any law enforcement officer whose duties include the collection, preservation, and submission of evidence to the North Carolina State Crime Laboratory.

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SPECIAL NOTICE # 1

EVIDENCE SEALS

All evidence submitted to the North Carolina State Crime Laboratory **must** be in a sealed condition. The only seals which will be accepted are:

- Tape
- Heat Sealed Packages
- Packages with Tamper-Proof Seals

All evidence seals **must** be initialed by the person sealing the package or placing a seal on the package.

In the case of tape, the initials may be on the tape, under the tape (if the tape is clear), or partly on the tape and extending onto the package surface. But, in any case, the initials **must** be either on the tape, under the tape, or partially on the tape.

For tamper-proof packages, the initials must be on the seal. For heat sealed packages, the initials must be as close as practical to the seal.

Evidence which does not meet the sealing requirement cannot be accepted for analysis by a North Carolina State Crime Laboratory.

If it is not practical to package a piece of evidence, such as an entire vehicle, the officer or technician submitting that evidence should securely attach a tag to the evidence and initial the tag.

All evidence containers/packages must be sealed to the extent that nothing may be added to or removed from the container/package.

SPECIAL NOTICE # 2

EXPLOSIVES and HAZARDOUS DEVICES

All explosive related evidence shall be hand carried to the Raleigh Laboratory. If the evidence involves an improvised explosive device (IED), then it is the responsibility of the submitting officer to make sure that the device has been rendered safe by a qualified individual such as a certified bomb technician, an EOD specialist, or a member of the SBI Hazardous Device Unit.

When explosive or hazardous device evidence is going to be submitted to the Laboratory, one of the following individuals should be contacted **prior to submission**:

- Evidence Control Unit Supervisor
919-662-4500 (Ext. 1216)
- Forensic Scientist Manager
Trace Evidence Section
919-662-4500 (Ext. 3520)

This contact should be made so that proper personnel will be on hand at the time of submission.

Extra precaution must be taken when handling materials such as flash powder and blasting caps. These materials are sensitive and spark sensitive. If there are any questions regarding the submission of explosive or hazardous device evidence, contact the Forensic Scientist Manager of the Trace Evidence Section **before** arriving at the Laboratory with the evidence.

Where to Submit Evidence

Submit Evidence to the
Laboratory Serving Your Area:

North Carolina State Crime Laboratory
Post Office Box 2000
Garner, North Carolina
27529-2000
(919) 662-4500 (Ext. 1501)

Commercial deliveries only, use:

121 East Tryon Road
Raleigh, North Carolina 27603
Attention: Evidence Control

Western Regional Laboratory
Post Office Box 2408
Skyland, North Carolina
28776-2408
(828) 654-0525

Commercial deliveries only, use:

9B Walden Ridge Drive
Asheville, North Carolina 28803

Note: The Western Regional Laboratory only accepts
Drugs, Latent, Firearms Evidence and Fire Debris Analysis.
For a list of counties serviced by the Western Laboratory; please see page 7.

Triad Regional Laboratory
2306 West Meadowview Road, Suite 110
Greensboro, North Carolina 27407

The above address is to be used for all mail deliveries.

Note: The Triad Regional Laboratory only accepts
Drugs, Toxicology, Latent and Computer Evidence.
For a list of counties serviced by the Triad Regional Laboratory; please see page 7.

Should you have any questions about which Laboratory handles your evidence, please call the Laboratory for assistance **prior** to submitting the evidence.

The State Crime Laboratory is moving toward total online automation. In the near future, information pertaining to submissions of evidence will be pre-logged by law enforcements officers or personnel while at their respective agencies. A website will be made available for this process as well as instructions on how to complete the pre-log process. Additional information will be disseminated to law enforcement agencies upon implementation of this new process.

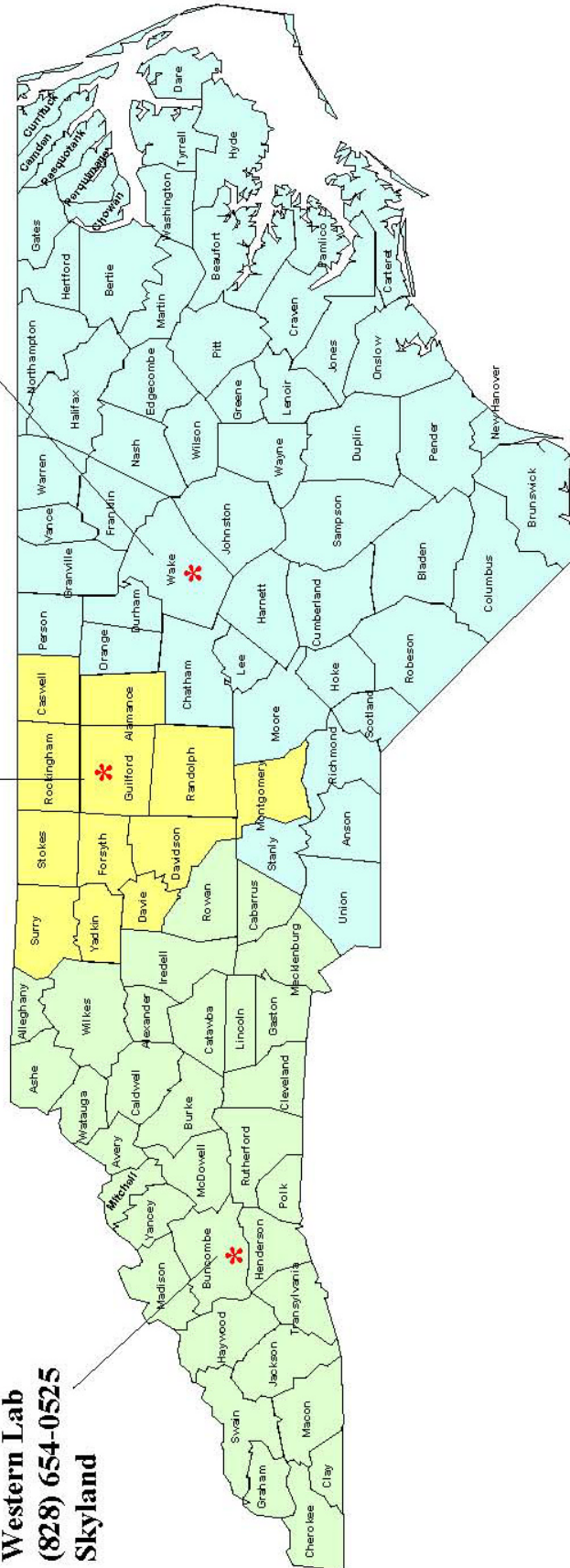
Western Regional Laboratory provides service for the following counties:

Alexander	Iredell
Alleghany	Jackson
Ashe	Lincoln
Avery	Macon
Buncombe	Madison
Burke	McDowell
Cabarrus	Mecklenburg
Caldwell	Mitchell
Catawba	Polk
Cherokee	Rowan
Clay	Rutherford
Cleveland	Swain
Gaston	Transylvania
Graham	Watauga
Haywood	Wilkes
Henderson	Yancey

Triad Regional Laboratory provides service for the following counties:

Alamance	Montgomery
Caswell	Randolph
Davie	Rockingham
Davidson	Stokes
Forsyth	Surry
Guilford	Yadkin

**Raleigh Lab
(919) 662-4500
Raleigh**



SBI Crime Lab Division

August 12, 2008

If you need field assistance prior to collecting or submitting evidence:

The North Carolina State Bureau of Investigation maintains District Offices located across the state. Assistance is available to any law enforcement agency in the state for processing crime scenes and collecting evidence. Each SBI District Office has at least one crime scene search specialist whose primary purpose is to assist law enforcement agencies in the proper location, collection, preservation, and packaging of evidence at crime scenes.

You may request crime scene assistance through the appropriate SBI District Office.

In many cases, additional technical field assistance is available from the Crime Laboratory; however, it is generally best to first contact the appropriate SBI District Office.

If assistance is needed after regular working hours, you may make your request through the SBI Operations Center at 919-662-4500. If you are not sure which SBI District Office serves your area, you may call 919-662-4500 to obtain that information.

EVIDENCE CONTROL UNIT

Evidence Control Units in the Raleigh Laboratory and the Western and Triad Regional Laboratories ensure proper evidence flow and tracking. The Evidence Control Units receive, distribute and return all evidence processed by the State Crime Laboratory.

Evidence Technicians, and other approved personnel, receive and store all evidence submitted to the Laboratory after the case information is logged into the Laboratory's Forensic Advantage (FA) system. The evidence is transferred to the appropriate Laboratory analyst(s) for analysis upon request. Generally, the submitting officer will not meet directly with the analyst who will conduct the analysis. Exceptions to this practice may be made for individual cases when circumstances require the submitting officer to talk directly with the analyst(s). If you feel you have a special need to discuss certain aspects of your case, you may request such a meeting with the analyst(s).

EVIDENCE ACCEPTANCE POLICY

The State Crime Laboratory accepts evidence which meets the following criteria:

- The evidence has been obtained as the result of an official criminal investigation.
- The submitting agency is a law enforcement agency or company/campus police agency certified or commissioned through the North Carolina Criminal Justice Education and Training Standards Commission, The North Carolina Sheriffs' Education and Training Standards Commission or the North Carolina Company and Campus Police Program.
- The investigating officer intends to pursue a criminal case pending the results of evidence analysis and/or the related investigation.
- The evidence has not been previously examined by another analyst or laboratory, unless prior approval has been requested and received from the Crime Laboratory Director.

EVIDENCE SUBMISSION PROCEDURES

Adherence to proper evidence submission procedures is essential for analysts to evaluate evidence properly, to maintain the chain of custody, and to maintain the physical integrity and evidentiary value of submitted items. Failure to follow the Laboratory's instructions when submitting evidence could result in the evidence being returned unanalyzed.

Should you have any questions as to the proper evidence submission procedures, it is always best to call the Laboratory first.

Submission Forms

- Attached to each “Request for Examination of Physical Evidence” form is an instruction sheet with numerous submission highlights. Please read the instruction page in its entirety before completing the form.
- Fill out the “Request for Examination of Physical Evidence” form (SBI-5) **completely**, supplying all information requested. Be sure to complete Parts B, C and/or D as instructed.
- Use a continuation page (SBI-5A) when needed. Both SBI-5 forms and Continuation forms are available from either the Evidence Control Unit or DCI Terminal SBM1.

The SBI Supplement form must be completed on all computer forensics requests. The form must indicate the legal authority by which the computer evidence was seized and a copy of the legal documentation (search warrant, court order, etc.) must be attached to the form.

The chain of custody of each piece of evidence submitted must be tracked while in the possession of the Laboratory; therefore, do NOT use separate page(s) for itemization of the evidence.

Type the form or print it legibly, ensuring that all copies are useable.

Please request additional forms before you run out, by phone or DCI Terminal SBM1.

- Do not allow submission forms, packages, or other cases you may be transporting, to become contaminated by biological or other potentially hazardous evidence. Keep all submission documents and other evidence away from contaminated evidence when preparing evidence for submission to the Laboratory or transporting evidence to the lab. For safety reasons, stained submission documents will not be accepted by the Laboratory.
- Some considerations for completing the form include:
 - (1) **Requesting Officer:** Please use the same officer for all submissions in a given case. This simplifies keeping case records together, as well as grouping submissions on the Laboratory report. The Laboratory always returns evidence to the **Requesting officer** unless otherwise requested on the SBI-5.
 - (2) **SBI File #:** When an SBI Field Agent is involved with a case, supply that agent’s file number (both new and old number when applicable). Indicate on the SBI-5 the CAA (Case Agent Assigned) and the DIC (SBI District Office in Charge) - this information is available from the SBI Field Agent.
 - (3) **Lab #:** If evidence has previously been submitted in a case and you know the Laboratory number, please provide that number. If you do not know the specific number, please advise the Laboratory that other evidence has been submitted in the

case.

- (4) **Race/Sex/Age:** Provide this information for all suspects and victims as it is valuable in several kinds of Laboratory analyses. If an individual's date of birth is unknown, provide your best estimate of the person's age.
- (5) **Analysis Requested:** Be as specific as possible. If you are not sure of what tests may be performed, please call the Laboratory prior to completing the form, or refer to the appropriate sections of this guide for further information. Clearly state the analysis you need performed on each item of evidence. Clarify the request if necessary stating what you need to know from the analysis on the bottom of the form or on a separate sheet of paper. The Laboratory will not arbitrarily examine evidence without a specific request for each discipline needed clearly requested on the SBI-5.
- (6) **Origin of Evidence:** Give the exact location where the evidence was seized or collected, (i.e., victim (name), suspect (name), bedroom, vehicle, etc.) **Note: For the safety of all who might handle the evidence, always indicate when evidence was recovered or seized from a body cavity or contaminated area.**
- (7) **Disposition of Evidence:** The Laboratory is not a long term storage facility. Bulky evidence, large quantities of controlled substances, and some hazardous material evidence will be retained with the understanding that it **must** be picked up by the submitting agency within fifteen days.
- (8) **Remarks or Synopsis:** Briefly describe in Part B of the submission form what happened. Supply sufficient detail to illustrate how the evidence submitted relates to the investigation. A copy of your investigative report may suffice if it contains that information. Be sure to specify why you are submitting each item so that analysts may conduct appropriate examinations.
- (9) By submitting this form, you acknowledge and approve Laboratory personnel to use the most appropriate and up to date methods authorized by our Laboratory and/or sample submission to another Laboratory to best meet your needs.

Evidence Packaging

- Package and seal each item individually as appropriate for that type of evidence. See specific sections of this guide for more detailed instructions. One basic rule of evidence packaging is:

Do not use plastic bags for bloody clothing or undried plant material.

- Mark each item with the item number you listed on the SBI-5, your name or initials, and your case number. Complex item numbers which include both letters and numbers (e.g., FRM-1-360) create tracking problems within the Laboratory. Please limit item numbers to simple numbers which run in numerical order.
- Seal and package evidence with protective padding to prevent breakage, leakage, cross-contamination, or deterioration. Note: An evidence package is considered sealed only if its contents cannot readily escape and if entering the container results in obvious damage/alteration to the seal. **Stapled or zip-locked seals are not proper seals.**

REMEMBER: All seals must be initialed (with permanent ink) by the individual sealing the evidence and the initials must be on or under the tape. It is a good idea to initial the seal in such a manner that the initials extend off of the tape onto the package.

- When possible, place all sealed items that will be processed by a single Laboratory Section into one container (e.g., envelope, bag, box) and seal that container. For example, in a drug case involving four separate items, seal each item individually and then place it together with the other three into one larger container. Identify the container as to what items are inside.
- If you submit numerous items in a case for examination by separate Sections of the Laboratory, divide the items into sealed containers according to the Laboratory Sections that will receive the evidence. This helps to maintain the chain of custody as persons in the chain, but not involved in evidence analysis, need not open and mark each individual item.

In-Person Submissions

- Bring all copies of the evidence submission form to the Laboratory. The forms will be signed showing transfer of the evidence to us, and one copy will be returned to you as a receipt. Due to the heavy volume of incoming evidence, Laboratory personnel will not sign other agencies' receipts.
- Personal delivery of evidence is the preferred method for any computer evidence, perishable evidence, items of significant monetary value, firearms, and large quantities of controlled substances.
- **ALL WEAPONS TO BE SUBMITTED AS EVIDENCE ARE TO BE PLACED IN THE GUN RACK UPON ENTERING AN SBI EVIDENCE SUBMISSION AREA.**

- **Weapons should be unloaded prior to submission; however, if the weapon is loaded due to a technical reason, advise lab personnel immediately upon your arrival. See Firearms guidelines.**
- When a weapon is submitted to the Laboratory, it will be inspected to ensure the weapon is unloaded and safe prior to receipt.

If a weapon cannot be unloaded or should not be unloaded for technical reasons, a Firearms Examiner will be made available to assist you.

Mail Submissions

- Only enclose evidence from one case per package. Generally speaking, a case is defined as an incident. Do not package or mail multiple cases (or incidents) together.
- Place all sealed, packaged items into a strong, suitable sized cardboard box. An envelope may be used if there is no danger of damage from rough postal handling.

Pad the evidence to prevent shifting or damage during mail handling. Seal the container adequately with strong tape and **initial the seals**. Wrap boxes with brown paper whenever possible.

- Place the original and first copy of the submission form (SBI-5) into an envelope addressed to the correct Laboratory location, and make sure your return address is clearly indicated. Tape this envelope to the **outside** of the evidence package. Keep the third copy for your records.
- Mark the outside of the package Attention: Evidence Control. **Do not indicate drugs, firearms, or victim/suspect names on the outside of the package.**
- Apply proper postage and send via first class mail or appropriate commercial carrier. Live ammunition and weapons have strict shipping requirements. Be sure to check with your shipper on these restrictions prior to mailing these types of evidence.
- Any package containing biological materials or materials exposed to biological contamination **must** be properly identified as **BIOLOGICAL HAZARDS**. The USPS should be contacted with any questions regarding the mailing of evidence of this nature.

Evidence Submission Checklist

- Are the evidence submission forms **completely** filled out including the supplemental form and Parts B, C and D as instructed?
- Is there an original submission form for the Laboratory and a copy for you?
- Have you indicated the type analysis needed for each item of evidence?

- Is each item of evidence separately marked, packaged separately and sealed? Are the seals initialed?
- Is the overall package properly sealed and marked? Are the seals initialed?
- Are two Laboratory copies of the submission sheet in an envelope attached to the **outside** of the main package so that the sealed evidence package will not have to be opened to remove the forms?
- Is your return address legible?
- Has the appropriate postage been affixed?

Change in Case Status/Information

If the status of a case or the progress of an investigation changes and there is no longer a need for the evidence to be analyzed, please advise us of the change via fax to the Raleigh Laboratory at (919) 661-5849, to the Western Regional Laboratory at (828) 654-9682 and to the Triad Regional Laboratory at (336) 315-4956. Knowing that the analysis is no longer needed will free valuable analysis time for other cases.

Requests to correct erroneous information after submitting the original Request for Examination of Physical Evidence form may be made in writing or via telephone conversation by the officer or agent who made the initial request. Such requests may also be made via fax to the Raleigh Laboratory at (919) 661-5849, to the Western Regional Laboratory at (828) 654-9682 and to the Triad Regional Laboratory at (336) 315-4956. The request must refer to the erroneous information which appeared on the submitted form and specify the appropriate change(s).

Rush Cases

The Crime Laboratory has placed into effect a new procedure for assigning a rush status to cases. The Rush Request Form is to be used for requesting rush status. The form must be filled out and signed by the DA or ADA handling the case in order to be considered.

Protection of Evidence from Deleterious Change

It is the responsibility of the Laboratory to ensure, insofar as reasonable and possible, that evidence does not undergo deleterious change while in our possession.

However, proper collection and packaging of evidence are the responsibility of the submitting officer. One of the purposes of this field guide is to make investigators aware of how to handle certain evidence to prevent deterioration prior to its submission to the Laboratory.

When an officer delivers evidence packaged in such a condition or in a container in which the evidence will deteriorate, he/she may be asked to repackage the evidence prior to submission.

DRUG CHEMISTRY AND TOXICOLOGY SECTION

Capabilities and Services

- Analyses to determine the presence of controlled substances
- Analyses of alcohol in blood in DWI cases
- Analyses of controlled substances in blood in DWI cases
- Analysis of non tax-paid alcohol
- Clandestine laboratory investigations

Evidence Submission Guidelines

The Drug Chemistry Section accepts evidence if a criminal arrest has been made or is anticipated. Evidence from concerned parents, schools, organizations, private citizens; found property, or evidence that has no value for criminal prosecution will not be accepted. A suspect's name must be listed on the SBI-5.

- Submit evidence by United States mail, commercial carrier (such as UPS), or in person. Avoid courier mail, as it does not provide as reliable a chain of custody as other methods of evidence submission.
- Personal delivery represents the safest method of submitting evidence to the Laboratory. When submitting sizable quantities of any drug, try to arrange an appointment for personal delivery.
- Fill out the Request for Examination of Physical Evidence form (SBI-5) completely prior to submission. If the evidence is to be mailed to the Laboratory, attach an envelope containing the SBI-5 form to the outside of the evidence. For security reasons, do not label the outside packaging "Drugs" or "Drug Evidence."
- Drug evidence seized from different people should be submitted on separate SBI-5 forms, even if the people were arrested at the same time or at the same incident. This procedure will result in separate Laboratory reports being issued for each person, which will avoid problems and confusion in subsequent judicial proceedings.
- Drug evidence seized from the same person on different dates should be submitted on separate SBI-5 forms.

- Evidence seized from body cavities or evidence contaminated with blood, body fluids or biological waste should be clearly marked as a biohazard and notations concerning this evidence should be made on the SBI-5. Submitting officer should make every attempt to remove contaminated packaging and submit in clean bags.
- Use numbers when labeling items of evidence. Do not use letters or Roman numerals.
- Submit the best evidence in each case, omitting drug paraphernalia, powder residues and cigarette butts.
- Because of the high volume of evidence coming into the Drug Chemistry Section, do not submit multiple items in misdemeanor cases. Similarly, do not submit misdemeanor amounts and residues in felony cases.
- Be sure that all items are properly separated and sealed to prevent cross-contamination. Place each item in a separate container and then seal all items into one container for submission to the Laboratory.
- Avoid excessive use of tape on evidence packages. Close and seal evidence containers carefully, but not so as to make them difficult to open without damaging the contents.
- Never enclose tablets, cigarettes, or powder residues in tape.
- Do not submit used field test kits.
- Avoid sending plants (including mushrooms and cacti) to the Laboratory unless they have been thoroughly dried. Green plants which are sealed in plastic bags will decompose, destroying their evidentiary value.
- Do not send entire plants and do not send plants with the roots still attached; a representative sample is sufficient.
- Do not send obviously non-controlled items to the Laboratory.
- When submitting items containing suspected controlled substances for latent print and drug analysis, separate the suspected controlled substance evidence prior to submission.

- The inherent dangers of hypodermic syringes, including the transmittal of disease (AIDS, hepatitis, etc.) is significant. The Drug Chemistry Section will not accept hypodermic syringes for analysis unless a written request for analysis is made by the District Attorney or an Assistant District Attorney indicating that the evidence is essential to a criminal prosecution.

An exception to this guideline is commercially prepared hypodermic syringes (*Tubex*, *Carpject*, etc.) which contain a pharmaceutical preparation and the request for analysis is to determine dilution/substitution of the pharmaceutical preparation.

Limitations to Evidence Submission

- The Drug Chemistry Section generally will not identify more than two items from the same schedule of the Controlled Substances Act per suspect in any given case unless the analysis of the additional items will shift the charge from a misdemeanor to a felony (as in the case of marijuana or Schedule II, III, and IV substances) or to a trafficking charge.
- When two or more subjects are charged collectively with the same items, the group will be treated as a single individual for purposes of analysis.
- Because the Laboratory has a very limited storage capacity, bulk quantities of controlled substances will be sampled or analyzed by a chemist and returned to the submitting officer on the same day. To ensure that a chemist is available, contact the Drug Chemistry Section for an appointment before transporting evidence to the Laboratory.
- Evidence in product liability cases, drug residues on U.S. currency, and cases involving stomach contents (lavage) will not be analyzed.
- Carefully evaluate the circumstances surrounding suspected poisoning. The Drug Chemistry Section will not accept poison cases unless prior approval has been obtained from the Section Forensic Scientist Manager. The Laboratory does not analyze for bacterial toxins, which occur when food spoils. County Health Departments, the North Carolina Department of Health and Human Services (Laboratory Services Division) and the North Carolina Department of Agriculture (Food and Drug Protection Division) laboratories analyze for bacterial toxins. Domestic disputes and complaints of bad-tasting food or beverages do not warrant the submission of items to the Laboratory.

Drug Dilution/substitution Cases

- When submitting injectable liquids for dilution analysis, a control sample of each type of drug in question must be submitted.
- Make sure the control sample is from the same manufacturer and is of the same dosage level (concentration) as the questioned sample.

Non Tax-paid Alcohol Cases

- The Drug Chemistry Section determines ethanol, methanol, and isopropanol concentrations for illegally manufactured liquor. In cases dealing with multiple buys or numerous samples from the same source, only two random samples will be analyzed.
- Alcohol analysis requires only small samples of the liquor. Submit only a 5 ml sample of liquor for analysis. The Laboratory will provide small sampling vials if needed.

Toxicology Cases

The Toxicology Unit of the Drug Chemistry Section analyzes blood to determine the presence of alcohol or controlled substances in DWI cases. Analysis of blood to determine the presence of alcohol or controlled substances in other criminal cases will be done at the written request of the District Attorney or Assistant District Attorney.

The Toxicology Unit will NOT screen blood for controlled substances when the blood has an alcohol concentration above the statutory minimum to show impairment (0.08 gram of alcohol per 100 milliliters of whole blood) except in cases involving personal injury to someone other than the suspect and a request has been made for a drug screen. Such a request must come from the District Attorney and be approved by the Forensic Scientist Manager of the Drug Chemistry Section. A form letter submitted with the evidence prior to any knowledge of blood alcohol results, does not qualify as a valid request for blood drug analysis.

The Toxicology Unit does not conduct employee screening for controlled substances or participate in drug monitoring programs. Blood or urine samples related to such programs will not be accepted for analysis.

The Office of the Chief Medical Examiner conducts all analyses related to death investigations. Postmortem evidence, including drug paraphernalia and controlled substances found with a deceased person, should be submitted to the Toxicologist in the Chief Medical Examiner's Office.

Blood Specimens

Please observe the following guidelines when submitting blood for analysis:

- Submit all blood in commercially available kits such as *Vacutainer* or *Venoject*. Use only kits which contain a preservative and an anticoagulant (gray top test tubes).
- Do not submit dried blood samples. The Toxicology Unit cannot test dried blood samples for alcohol or drugs.
- Be sure the person taking the blood sample does not leave the needle or other unnecessary items in the kit.
- Use the protective packaging included with the kit for submission to the Toxicology Unit of the Drug Chemistry Section.
- Collect 20 ml of blood in two 10 ml test tubes from the suspect as soon as possible after the incident in question.
- Do not send blood collection kits from different suspects as part of the same evidence submission.
- Blood samples need to be protected from heat, and storage in a refrigerator is recommended.
- Indicate any suspected controlled substance being used by the suspect on the SBI-5 when submitting the suspect's blood for analysis.
- After the analysis is completed, biological toxicology evidence will be retained by the Laboratory.
- Please note that blood-alcohol analyses conducted by hospitals often give higher concentration values than those conducted by the Toxicology Unit because hospitals use blood serum instead of whole blood for their analyses.

Urine Specimens

- Collect and submit urine and blood samples in drug facilitated assault/rape cases.
- Do not submit urine samples for DWI cases, except when testing for GHB (gamma hydroxy butyric acid) is requested.
- Use a leak proof container placed in a zip-lock type plastic bag when submitting a urine sample.
- Collect at least 20 milliliters of urine for analysis.

Report Interpretation

The Drug Chemistry Section reports analysis results as follows:

- Blood-alcohol concentrations are reported as grams of alcohol per 100 ml of whole blood.
- Any weight listed on the Laboratory report shows only the weight of the material identified and does not include the weight of the bags and containers.
- The report of a “trace” or “residue” amount of a controlled substance when a non-controlled substance is the major component indicates that the material or packaging had at one time been exposed to that controlled substance, and still has residual amounts of the controlled substance present. The controlled substance could have originated from outside sources, including contaminated utensils used in drug processing.
- Particular salt forms of a drug are not usually reported. For example: morphine sulfate, cocaine hydrochloride, or methamphetamine hydrochloride would generally be listed on the Laboratory report only as morphine, cocaine, or methamphetamine, respectively. The form of cocaine more commonly known as “crack” will be listed as cocaine base when such identification is possible.
- Alcohol concentration for liquor submissions are reported as a percent by volume. To convert the concentration to “proof,” double the percent concentration (e.g., 80 percent by volume equals 160 proof).

LATENT EVIDENCE SECTION

Quick Find Index

- Section 1 Services**
- Section 2 Evidence Submission**
- Section 3 NC State Automated Fingerprint Identification System (SAFIS) and FBI Integrated Automated Fingerprint Identification System (IAFIS)**
- Section 4 Footwear and Tire Impressions**
- Section 5 Report Interpretation**

1. Services

The Latent Evidence Section provides assistance in the analysis of any item of evidence which falls into one or more of the following categories:

- **Latent Fingerprints**
- **Latent Palmprints**
- **Latent Footprints (bare feet)**
- **Footwear Impressions**
- **Tire Impressions**
- **Other Impressions (gloves, etc.)**

Although the term “latent” refers to hidden or invisible impressions, the Latent Evidence Section also accepts and analyzes “patent” (visible) impressions. Please note that throughout the following guidelines, “latent” refers to both visible and invisible impressions.

Latent fingerprints, palmprints, and footprints may be of sufficient value for *positive* identification purposes. Such evidence may indicate that a subject’s finger, palm, or foot *did* make the impression in question, based on the scientific improbability of two friction ridge skin formations being exactly the same.

On much the same premise as fingerprint identification, tire and footwear examination results are judged on a track’s uniqueness, individuality, and class characteristics. Positive identifications may be made in footwear and tire track cases and may indicate that a specific shoe or tire *did* make the impression in question.

In conjunction with the Office of the Chief Medical Examiner, the Latent Evidence Section provides assistance in the identification of unknown deceased individuals. For such assistance, contact the Latent Evidence Section on a case-by-case basis.

The Section also provides limited technical field assistance in the collecting of latent prints, footwear impressions, and/or tire impressions. Please contact the appropriate SBI District Office's Crime Scene Search Specialist and allow him/her to review the scene and to determine if additional Laboratory assistance is required.

2. Evidence Submission

Latent Fingerprints, Palmprints, and Footprints

Some of the factors affecting latent prints and their quality include the surface material containing the latent print(s); the amount of perspiration, oils, and foreign matter on fingerprint ridges; weather conditions; pressure; duration; and the handling of the item containing the latent fingerprint(s). Latent prints are very fragile and may easily be destroyed; therefore, extreme care should be used when handling any item suspected of containing latent prints.

If evidence is processed at the scene and latent lifts or photographs of this evidence will be submitted to the Latent Evidence Section, keep the following in mind:

- Develop a routine or pattern in fingerprint processing to ensure each scene is completely examined. Entrance and exit areas, if known, are of primary importance. **First**, search the scene for tire and footwear impressions, then for latent prints. Also, examine other areas believed to have been occupied by the perpetrator(s).
- Articles that appear to have been moved or disturbed may also indicate a perpetrator's movement. However, the perpetrator may have been careful not to leave impressions, so make attempts to locate and process any articles left by a suspect.
- Always process surfaces suspected to have been handled, even if the evidence has a surface believed to be a poor medium for latent prints. Most fingerprint technicians have been surprised at one time or another by a surface from which an identifiable latent print has been recovered.
- Most crime scene processing for latent prints consists of using photography and powders. Latent print processing with powders involves the gentle application of powder to the slightly adhesive skin oils left on the surface of non-porous items.
- Apply powder with a brush dipped in fingerprint powder, or use a magnetic wand dipped in special magnetic powder. Generally, black will be the only powder color needed, even on black or dark colored items (the latent prints will actually be grayish in color when developed). **Please note that black fingerprint powder is generally easier to use than silver or fluorescent powders as these powders have a tendency to coat the surface area as well as the latent prints, making differentiation of the latent prints from the background more difficult.**

- Powdering and lifting latent prints takes practice, and we recommend that training include a variety of shapes and surfaces likely to be encountered at a crime scene. Remember, once a print is destroyed, it *cannot* be reconstructed.
- After a print is developed on a non-porous surface, photograph it if equipment is available, being sure to **include a scale in the picture** so that the print may later be restored to accurate size. Photograph the print at a 90 degree angle.
- To lift the developed print with fingerprint tape, smoothly place the tape onto the print and press to eliminate wrinkles and air bubbles which would interfere with the pattern. **DO NOT leave the tape on the item.** Carefully peel the tape off in one continuous motion, and smooth it onto a contrasting lift card surface.
- A thicker, more pliable fingerprint tape (polyethylene tape) is now on the market. This product allows the lifting of latent prints from curved surfaces without wrinkling.
- Supply the following information on all lifts:
 1. The name (or initials) of the individual making the lift,
 2. The date the lift was made,
 3. A case number or other identifying number, and
 4. An indication of where the lift was obtained.
- **Be sure to mark an “X” over any prints left on the tape by the lifting officer.**
- Porous or absorbent surfaces, such as paper and unfinished wood, ordinarily cannot be processed with powders, as skin oils soak in and are not left exposed to the powders. Chemical processing in the Laboratory and photography to preserve the image may make such prints visible for comparison. Due to the necessity for photographing these reactions, and the danger of the chemicals involved, such processing must be done in a laboratory.
- **DO NOT** process or attempt to lift prints in blood. Allow bloody items or prints to air dry naturally. Do not dry with forced hot air (e.g., hair dryer).
- Only when a specific item of evidence cannot be submitted should an attempt be made to process a bloody print. Please call the Latent Evidence Section on a case-by-case basis.
- For wet items, the best results will be obtained in the Laboratory. Allow wet item to air dry naturally. **Do not dry with forced hot air** (e.g., hair dryer).
- In the event that you *must* process a wet item for latent prints, the Latent Evidence Section recommends the use of Small Particle Reagent (SPR).
- Various laser and light source instrumentation are available in the SBI Crime Laboratory. The equipment has limited capabilities in field situations, and is best utilized in a controlled environment.

- In general terms, any item that experience tells you is a difficult surface for latent prints should be submitted to the Latent Evidence Section for processing.

When submitting evidence to the Latent Evidence Section, please observe the following guidelines:

- Follow the Crime Laboratory's standard evidence submission procedures. **Check all packages for proper seals and sufficient labeling.**
- Wear surgical (or smooth surface) gloves and handle evidence "lightly." Do not write or place labels or tape on evidence to be processed for latent prints.
- Package evidence in a suitable container that will prevent any possible impressions from smudging or damage.
- Hand-carrying fragile evidence to the Laboratory is the best way to prevent damage.
- Do not package wet items. Air dry items and then package them in paper bags or cardboard boxes.
- When submitting tape, package each strip or piece in separate containers **(preferably plastic bags or containers)** to prevent the loss or cross-contamination of trace material, and to prevent pieces from adhering to one another.
- The Latent Evidence Section will not accept controlled substances. Remove drug evidence from any container **PRIOR to it being** submitted for latent print analysis. Place such items in a non-evidence container and label carefully.
- The Latent Evidence Section will not work narcotics cases in which evidence was acquired through hand to hand buys by a sworn law enforcement officer and Possession of a Firearm by a Felon cases in which a sworn law enforcement officer removed the weapon from the subject. An exception may be granted if a request in writing is submitted from the District Attorney.
- The method of analyzing an item of evidence is determined by the analyst assigned to each case. In the event that special circumstances exist which cause you to request a specific type of analysis, please attach a letter of explanation.
- In latent print cases, provide both entire fingerprint *and* palmprint impressions of the subjects involved. This is especially important in cases involving numerous latent prints. When fingerprinting someone, collect complete and legible prints. Please note that prints suitable for classification purposes are not always of sufficient quality for latent print comparisons.
- Submit a subject's full name, race, sex, state identification number (SID), *and* date of birth. If inked impressions are not submitted with the evidence, the SBI Identification files will be checked.
- If it is necessary to have the FBI Identification files checked, please notify the examiner.

- Please note that there is no scientific method for determining the age of a latent print.

3. NC State Automated Fingerprint Identification System (SAFIS) and FBI Integrated Automated Fingerprint Identification System (IAFIS)

The Latent Evidence Section provides local agencies with access to the NC State Automated Fingerprint Identification System (SAFIS) as well as the FBI's Integrated Automated Fingerprint Identification System (IAFIS). The SAFIS computer stores images of most of the ten-print fingerprint cards on file at the State Bureau of Investigation. The IAFIS computer stores most criminal fingerprint cards maintained by the Federal Bureau of Investigation. These criminal fingerprint cards may be transmitted to the Latent Evidence Section via the internet.

The SAFIS computer is able to search a latent fingerprint and a latent palmprint from a crime scene against all criminal fingerprint cards stored in the system. If the person who left a fingerprint at a crime scene has a prior criminal record, and fingerprints from that record are stored in the SAFIS, the SBI may be able to identify the latent print and provide the name of a potential subject. Latent prints that are searched by SAFIS with negative results will be retained in the Unsolved Latent File (ULF) and will be *continually* searched against all criminal fingerprint cards stored in the system.

The IAFIS allows for latent fingerprints to be searched nationally. If a person has a criminal record in another state, the SBI may be able to effect identification to that individual. Please note that the FBI's IAFIS currently *cannot* search palmprints and does not have an Unsolved Latent File (ULF). Neither the SAFIS nor IAFIS is able to search the joints, sides or tips of fingers; or footprints.

In addition, do not assume that a crime was committed by someone who does not have a prior record simply because the SAFIS and/or IAFIS do not identify the latent fingerprints submitted from a crime scene. Not all criminal fingerprint cards are loaded into the SAFIS and/or the IAFIS, and depending on the quality of the fingerprint card entered into the SAFIS and/or IAFIS, it may be impossible to match a particular individual's fingerprints with those left at a crime scene.

SAFIS Evidence Submission

- Submit latent prints for SAFIS/IAFIS searches with a completed evidence submission form (SBI-5) to the Evidence Control Unit.
- When completing the required submission form, provide all requested information concerning potential subject(s). If known, include the gender (sex) of the subject(s), the race of the subject(s), or any other type of descriptive information.
- The State Crime Laboratory requires the submission of elimination inked impressions in all simple, property type crimes. **Any case of this type which is submitted without elimination inked impressions will be evaluated and compared to any available known standards. A search will be conducted of the SAFIS but will not be retained in the Unsolved Latent File (ULF) until elimination prints are submitted.** The submitting officer will be notified by report that elimination prints are needed.

- Any questions concerning the submission of SAFIS/IAFIS latent print searches should be directed to the Latent Evidence Section.
- Process arrest fingerprint cards through the Criminal Information and Identification Section. Please note that arrest fingerprint cards are for recording purposes only. Arrest fingerprint cards are not treated as evidence, and no chain of custody is recorded while they are being processed.
- Do not submit routine arrest criminal fingerprint cards to the Crime Laboratory unless you intend for them to be used as evidence.
- Do not submit latent fingerprint evidence to the Criminal Information and Identification Section.
- Any questions concerning arrest fingerprint cards should be directed to the Criminal Information and Identification Section.

4. Footwear and Tire Impressions

At many crime scenes, tire and footwear impressions are often as difficult to locate as fingerprints. Proper protection at the crime scene will reduce the chances of additional impressions being made by emergency and investigating personnel. Observant crime scene officers must seek out this evidence at all crime scenes.

- Entrance and exit areas are good places to check for footwear and tire impressions.
- Sometimes, doors are kicked and items inadvertently stepped on by someone. Consider such possibilities during crime scene processing.
- When footwear impressions are located on hard surfaces, occasionally they may be enhanced by fingerprint powder. If done improperly, this process may be detrimental to the impression, so great care should be taken when applying the powder. Always photograph any visible impressions prior to processing. If at all possible, seize the item in question and protect the impression. Transportation to the Laboratory is often justified in these cases so that evidence may be more elaborately processed and examined.
- In instances of dust prints, the impressions may be lifted with special gelatin lifters. Photographs of these impressions are important, as the lifts sometimes do not have sufficient contrast to conduct a comparison. In all photographs, aim the camera perpendicular or at a 90 degree angle to the impression and provide a scale. Show the center of the impression in the center of the frame to reduce distortion. Be sure the scale is not on or in the impression. Gel lifters will melt; therefore, do not store them in a hot environment (i.e. trunk of a car, etc.)
- Each SBI District Office's Crime Scene Search Specialist is equipped with an electro-static dust print lifter, a very good method for collecting dust impressions from smooth surfaces. To request this assistance, contact the SBI District Office in your area. **Dust impressions should never be placed in a cardboard box unless the box was manufactured and**

marketed especially for dust print lifts. The best method is to place the dust print lift inside a manila folder and then put the manila folder inside an envelope.

- The State Crime Laboratory recommends using dental stone to cast soil or soft material impressions. Plaster shrinks as it dries and may cause problems in comparing questioned impressions.
- Casting soil or soft material impressions involve a process of mixing the dental stone, pouring the dental stone into the impression, and making the proper identifying markings. As in fingerprint processing, this technique may be perfected through practice and experimentation.
- Photograph impressions in soil or soft material such as sand or mud, and then cast the impressions using dental stone. Place a scale in the photographs at the same level as the lowest part of the impression, taking care not to cover an area that may be useful for identification purposes.
- Do not clean casts. Damage to the cast or loss of crucial detail may occur.
- When photographing impressions, always:
 - 1) Use a scale and take the photograph perpendicular or at a 90 degree angle to the impression.
 - 2) Fill the viewfinder of the camera with the impression (i.e., get as close as possible).
 - 3) Submit negatives of film or a compact disc of digital images of impressions as evidence to the Latent Evidence Section.
- In all instances, attempt to obtain tires or footwear from those involved. Submit *both* shoes or boots, and any tire that could have made the questioned tire impression. Mark all submitted tires as to their location on the vehicle.
- Package items of evidence immediately in separate containers to prevent loss or cross-contamination of trace material.
- Elapsed time between when an impression is left at a crime scene and when the shoes or tires are collected may greatly affect the Laboratory's ability to conduct a conclusive examination. Collect known shoes and tires as soon as possible, and include the elapsed time between the offense and evidence collection when submitting items to the Laboratory.
- Please do not make impressions of shoes, boots, or tires being submitted to the Laboratory. Such "known standard" impressions are better done in the Laboratory where care of such evidence may be assured, and trace material may be controlled. The only exception would be if you are trained by the SBI in making tire tread standards. For best results, please submit the shoes or tires in which the comparison has been requested.
- Package footwear or tire impression evidence in a strong cardboard or wooden box. Cushion well with a suitable packing material. Dust impressions are the exception, as previously discussed.

- Due to the fragile nature of footwear and tire impression evidence, please hand-carry it to the Laboratory. If such evidence must be mailed, take extra care in packaging it.
- Contact the State Crime Laboratory if you have any questions. Latent evidence analysts will respond to any questions or concerns you may have about evidence collection and submission.

5. Report Interpretation

A latent print report lists the evidence processed and the results of the examination. A latent print that the examiner concludes may be identified is an “identifiable” latent print or a “latent print of value for identification purposes.” Identification may be effected should the inked impressions of the corresponding area be available for comparison. Reports with latent print identifications indicate the subject’s name and the finger or palm identified.

Footwear and tire impression reports list the items submitted and the result of the examination and comparison. Some of the conclusions that may be drawn by comparing footwear or tire impressions are listed below.

- The questioned footwear impression was identified as having been made by the right/left known shoe.
- The questioned tire tread impression was identified as having been made by the known tire.

(In this case, the examiner notes a sufficient number of individual, unique identifying characteristics in the same relative position on both the known and questioned impression.)

- The questioned footwear/tire tread impression was of a different outsole/tread design and was not made by the known shoes/tires.
- The questioned footwear impression corresponds in outsole design, physical size, and general wear with the known right/left shoe and could have been made by that shoe or any other right/left shoe having the same outsole design, physical size, and general wear.
- The questioned footwear/tire tread impression was insufficient for comparison purposes.

There are other conclusions that may be reported which are not listed. If you have questions about the results, please call the reporting analyst.

The Latent Evidence Section attempts to return evidence as soon as the examination is completed, as the Crime Laboratory has insufficient storage space to keep evidence until the court date. Evidence in all cases is usually returned to the requesting officer. In the event evidence is retained for pickup, please make arrangements to pick it up as soon as you receive the report.

TRACE EVIDENCE SECTION

The Trace Evidence Section deals with a wide variety of evidence not examined by other Sections of the Laboratory. Most of this evidence is very small and is not obvious to the investigator at a crime scene. The goal of the Trace Evidence Section is to identify these materials and compare them to a suspected source.

Standards represent the source of suspected transferred materials, such as walls, carpets, bedding, soil, ground debris, and so on. Analysts need standards to determine what types of materials were available for transfer and to compare with any materials found on questioned items.

The Trace Evidence Section normally performs accelerant, gunshot residue, hair, fiber, paint, glass, metals, explosives, physical match, headlight filament, white powders and pepper spray examinations. Analysis of unusual evidence such as feathers, wood, and plant material may be arranged.

Since particles analyzed by the Trace Evidence Section tend to be of small size, exercise great care not to lose particles or to transfer material between two items to be analyzed. The following precautions should be taken in order to prevent the contamination of the evidence:

- Do not interview the victim(s) and suspect(s) in the same areas.
- Keep the crime scene clear of unnecessary personnel.
- The suspect should never be brought back to the crime scene.
- Officers who have had contact with the suspect should not be allowed to participate in the search of the crime scene.
- Clothing items from the victim and the suspect should not be allowed to rest on the same surface before packaging.
- Each item of evidence should be packaged separately and as soon as possible.

The following pages of this guide discuss different types of trace evidence that may be found at a crime scene and the proper ways to collect and package the evidence. If you have any questions concerning the proper way to handle a specific type of trace evidence, please contact the Trace Evidence Section at (919) 662-4500.

Due to the wide variety of evidence analyzed in the Trace Evidence Section, this section of the Evidence Field Guide is arranged in the following order:

- [Hairs](#)
- [Fibers](#)
- [Paints](#)
- [Vehicle Parts](#)
- [Light Bulb Filaments](#)
- [Glass](#)
- [Physical Match](#)
- [Gunshot Residue](#)
- [Accelerants](#)
- [Pepper Spray](#)
- [Metals](#)
- [Explosives](#)
- [Suspicious White Powders](#)

HAIR EVIDENCE

Scope of Analysis - Hair Evidence

- Hair examinations are done by making microscopic comparisons of *head* and *pubic* hair collected from the victim and the suspect to the questioned hairs from the scene.
- Hairs from other parts of the body lack sufficient identifying features to be submitted for comparison (e.g., arm, chest, beard, or leg hairs).
- Please note that age and gender cannot be determined by hair analysis.

Standards for Hair Analysis

- Collect hair standards by plucking and/or combing a total of *50 full length hairs* from the head and pubic area only. Because hair characteristics may vary over the head and pubic region, investigators must collect the hair standards from various areas of each region. For example, comb and/or pluck hairs from the front, top, back, and sides of the head. *Never* collect hairs from one spot only and never cut locks of hair. If the trauma of plucking would be too great, then the hairs may be cut just at the surface of the skin, one at a time. In sex offense cases (especially rape), collect pubic hair combings *before* collecting a pubic hair standard. Place head hair and pubic hair samples in carefully labeled separate envelopes. Make sure that the seals are secure to prevent contamination of the hair standards.
- Collect and submit known hair samples from both the suspect(s) and the victim(s) as soon as possible after the incident. Proper standards from all parties (suspect, victim, elimination) are required if a hair analysis is to be performed. If possible, determine if an individual has dramatically altered their hair length or color between the dates of the offense and the collection of the standard.

- Since hairs often also undergo DNA analysis, a DNA standard (cheek scraping or blood sample) should also be submitted.
- Collection of Sexual Assault Kits.
- Frequently, medical personnel will collect sexual assault kits, which include pubic hair combings and hair standards, for investigators. In the event medical personnel seem unfamiliar with evidence collection, let them know that there is an instruction sheet contained within the kit. Emphasize the necessity of collecting proper head and pubic hair standards.
- Medical personnel do not have to collect standards. An officer may collect the required hair standards, as well as the cheek scraping.

Collecting Hair Evidence

- *Tweezers:* Hairs found at the crime scene or otherwise related to a criminal act may be collected using clean tweezers and placed in envelopes. When using tweezers, be sure not to squeeze the tweezers so hard that the hair is crushed or damaged.
- *Taping:* The lab will only accept tapings collected using clear fingerprint tape. Do not use frosted fingerprint tape, gel fingerprint tape or latent gel adhesive lifts. Wrap the tape around your hand and pat the surface where hair evidence may be located. Then place the tape immediately into a clean zip-lock or cellophane bag with the sticky sides against the plastic and seal the bag. Do not wad the tape or fold the sticky sides of the tape together. Do not allow the tape to stick to paper or cardboard.
- *Vacuuming:* Vacuum sweepings are not examined on a routine basis and are only examined with the prior approval by the Forensic Scientist Manager of the Trace Evidence Section.

Packaging Hair Evidence

- Wrap or bag each item of evidence separately in *paper or cardboard* for transportation to the Laboratory to prevent hairs on one item of evidence from being transferred to another. Hairs are durable and may be easily transported without damage as long as they are not crushed (e.g., by being placed under a heavy object).

Bulky Items

- Due to the limited personnel resources in the State Crime Laboratory, agencies are requested to tape bulky items (for example: clothing, bedding, furniture) for hair examinations. Exceptions to the above must be approved by the Forensic Scientist Manager of the Trace Evidence Section.
- After taping the item, the original item may still be submitted for DNA analysis. If hair analysis is desired on the item, please submit the tapings.

DNA Analysis of Hair Evidence

- Positive hair associations are automatically evaluated for DNA analysis. Therefore, known hair standards **MUST** be submitted with the evidence, as well as a DNA standard (cheek scraping).
- Nuclear DNA analysis: If hairs of evidentiary value are found, and if a suitable root is present, then the root will be removed and transferred to the DNA unit.
- Mitochondrial DNA analysis: If no suitable root exists, then the hair evidence will be sent to an FBI regional lab for mitochondrial DNA analysis (or to a private lab if requested).
- It should be noted that if DNA analysis on any evidence in the case is being conducted in Forensic Biology, no hair evidence will be examined. This is because DNA analysis is more conclusive than hair analysis. However, if Forensic Biology does not find any DNA evidence of value, then the evidence should be submitted to the Trace Evidence Section for hair analysis.
- In rare instances in non-suspect cases, hair may be approved for a CODIS search. This must have prior approval by the Forensic Scientist Manager of the Forensic Biology Section.

FIBER EVIDENCE

Scope of Analysis - Fiber Evidence

- Fiber evidence may help criminal investigators establish a sequence of events, corroborate witness information, identify murder weapons, and establish leads in a case.
- Fiber evidence may be found at the scene of various types of crimes, such as murder, rape, burglary, arson, hit-and-run, drug trafficking, and even extortion.
- Fiber examiners perform several different types of examinations, to include:
 - Comparison of questioned fibers/yarns/fabrics to knowns
 - Analysis and comparison of ropes, tapes, plastic bags
 - Analysis and comparison of garment construction and manufacturing characteristics
 - Analysis of fabric impressions
 - Cut/Torn determinations

- Fiber examinations are done by making microscopic and instrumental comparisons of questioned fibrous materials collected from the victim, suspect, or crime scene to known standards. There are many types of materials that fall under the umbrella of fiber examinations. These materials include:
 - Individual fibers or yarn fragments (from the point of entry, stuck to a weapon, under the flap of an envelope, on a vehicle involved in a hit-and-run, on a body, etc.)
 - Fabrics /Garments /Bedding /Upholstery
 - Carpet
 - Airbags
 - Tape (duct, electrical, packing, masking, etc.)
 - Ropes and Twines
 - Burned Fabric
 - Plastic Bags, tarps
 - Wigs / fake fur

Standards for Fiber Evidence

- Collect standards from all items that could have been involved in either a primary (direct contact) or secondary transfer (from an article contacted by both suspected and known items).
- Where a mutual transfer is suspected, treat both items as questioned.
- Whenever possible, submit the entire item. When this is not possible, collect a representative sample of as large a size as needed to show any variation in the item.
- Standards should be collected from larger items such as carpet or upholstery during the initial search of the crime scene. These items may not be available at a later date.

Collecting Fiber Evidence

- Obtain fiber evidence as soon as possible to prevent loss or contamination of the evidence. Consider fiber evidence a primary source of information, not a last resort.
- Yarns and larger fibers that may be easily seen may be collected using tweezers. The evidence should be placed into a container of suitable size and taped securely.
- Fibers may be collected from larger areas (i.e. car seats, furniture) using tape. Use clear fingerprint tape. Do not use frosted fingerprint tape, gel fingerprint tape or latent gel adhesive lifts.
- After collecting the fibers, place the tape immediately into a clean zip-lock or cellophane bag with the sticky side facing the bag and seal the bag.
- Do not wad the tape or fold the sticky sides of the tape together.

- Do not allow the tape to stick to paper or cardboard. Do not package tapings in paper bags or manila envelopes.
- Never vacuum. Vacuum sweepings collect too much evidence and reduce the evidentiary value of trace evidence.
- When collecting tapes, ropes, or cords, clearly identify cut ends. Protect knots; do not untie them.

Packaging Fiber Evidence

- Clothing and bedding should be placed in paper bags or cardboard boxes, taped securely, and then submitted to the Laboratory.
- Do not package loose fibers in plastic. The static formed between the fibers and the bag makes it difficult to work with the fibers. Use gel caps, metal tins, or envelopes.
- Make sure the packages are well sealed to prevent contamination.

PAINT EVIDENCE

Scope of Analysis - Paint Evidence

- Paint chips and smears may be transferred whenever a painted surface comes in contact with an object or a person. Hit-and-run and breaking-and-entering situations are the two most common criminal activities that are likely to involve paint transfers.
- Paint evidence is significant due to varying layer sequences, differences in chemical composition, and other physical characteristics.

Standards for Paint Analysis

Automobiles

- Collect standards from the area immediately adjacent to the damaged area.
- Collect paint standards from each panel of the car that is damaged, since bumpers, hoods, doors, etc. may have different types of paint even though they are the same color.

Other Objects

- Painted windows and door frames often have many layers of old paint. Submit wood sections containing all the paint layers.
- Submit the entire known object, if possible. This allows the analyst to determine the best location for standard collection.

Collecting Paint Evidence

Automobiles:

- For a typical automobile collision, collect a minimum of four samples for submission: a standard from each vehicle involved and a questioned sample from the damaged area of each vehicle.
- When contact occurs between an automobile and a person, submit the individual's clothing and any other personal items which may have been involved.

Burglary Tools: Burglary tools, such as screwdrivers and crowbars, may retain paint traces. Whenever possible, submit the entire tool for analysis.

Smears: Paint smears may be useful evidence. If possible, submit the entire object containing the smear (i.e., car bumper, mail box post). If this is not possible, carefully remove a portion of the object leaving the smear attached.

Technique for collecting paint (standards or if entire item cannot be submitted):

- Using a new razor blade (one for each sample), cut all the way to bare metal (or other substrate) to obtain whole paint chips. Sometimes cutting a wedge-shaped chip is easier. It should be noted that automobiles often have at least four layers of paint, so it is important to be sure that all of the layers are collected.
- Never use tape to collect paint chips, smears, or standards.

Packaging Paint Evidence

- Submit clothing in paper bags.
- Be sure to provide the paint examiner with the following information: color, make, model of vehicle, and the location of damage on each vehicle. Include a brief summary of how the accident happened.
- Paper folds make the best container for paint chips. Paper envelopes are also acceptable if all four corners and the flap are properly tape sealed.
- Plastic bags should not be used for paint chips or smears because the paint will develop a static electrical charge, making it more difficult to handle.
- Metal canisters may be used as containers for paint evidence, but they are not preferred because small paint chips tend to be trapped in the tape used to seal the canister.

PDQ Database of Automotive Paint Systems

- The purpose of the database is to attempt to identify the vehicle involved in an unknown hit-and-run (Vehicle vs. Person).
- In this type of case, the only evidence that needs to be submitted is the clothing of the victim. No standards are required for this type of analysis, as the offending vehicle is unknown.
- The following information may be derived from a PDQ search: color, make, model, year range, plant of manufacture, partial VIN.

VEHICLE PARTS

Scope of Analysis - Vehicle Parts

- During collisions, pieces may break off the suspect vehicle and remain at the scene.
- The scene should be searched for broken automobile parts, such as turn-signal covers, chrome strips, large paint chips, metal parts, and/or decorative items. Any items found should be collected.

Analysis of Vehicle Parts

- The part may be physically matched to the suspect vehicle providing proof that the vehicle was at the scene of the accident.
- If there is no suspect vehicle, the make, model, and year of the vehicle from which the part originated may be able to be determined.
- If it is a painted part, paint analysis may be conducted to try to link the part to a suspect vehicle.

LIGHT BULB FILAMENT EXAMINATION

Scope of Analysis - Light Bulb Filaments

- Light bulbs are examined in an effort to determine if the lamp was “ON” or “OFF” at the time of a motor vehicle accident. Headlights, parking lights, brake lights, turn signal lights, and marker lights may be examined. These bulbs are usually from, but are not limited to, automobiles and motorcycles.
- The filament area of the bulb is the most valuable part for Laboratory analysis, and even small pieces of the remaining filament may yield valuable information.

Collection of Filaments

- Be careful to prevent further damage when removing bulbs from vehicles.
- When necessary to prevent damage to the bulb, the entire lamp assembly should be removed by cutting connecting wires.
- Be sure to collect all of the bulbs from the impact area.

Packaging of Filaments

Take extra care to prevent damage to the filaments during packaging.

- Package each bulb or assembly separately.
- Styrofoam Cup
 - The remains of headlight bulbs should be removed and placed filament first into a Styrofoam cup.
 - Tape may then be placed over the back side of the bulb to attach the bulb to the cup.
- Padded Box
 - Smaller bulbs may be packaged in a small box that is padded with tissue paper.
 - The entire assembly may be placed in a padded container such as a box filled with tissue paper or bubble wrap.

Submission of Filaments

- All properly packaged items from the same case may be placed in a cardboard box with appropriate padding.
- Since mailed packages often encounter extensive damage, it is suggested that properly packaged items be personally delivered to the Laboratory.

GLASS EVIDENCE

Scope of Analysis – Glass

- When a window is broken, glass fragments rebound away from both sides. Fragments may be found in the hair or clothing of the suspect or victim as well as embedded in the object used to break the window.
- The most common types of cases with glass evidence are hit-and-run and breaking- and-entering.

- *Hit-and-Run:* In these cases, glass may be found on the clothing of the victim, at the scene, and possibly on the clothing of the suspected driver.
- *Breaking-and-Entering:* In these cases, glass may be found on the suspect's clothing and sometimes on the object used to break the window.
- There are several types of analysis performed at the Laboratory, but not all pertain to all types of glass. Usually, glass analysis consists of visual examination, elemental analysis, and refractive index measurements.
- Unfortunately, due to the limited number of glass manufacturers, glass analysis cannot absolutely identify the source of the questioned glass to the exclusion of all others. This is because many companies that use glass in their products buy from the same manufacturer. The examiner may only conclude that the glass from the questioned source is or is not consistent with the glass from the known source. The only way to identify the source to the exclusion of all others is through a physical match. Also, there is no glass database for the examiner to use that will identify what make/model of car or manufacturer the glass fragment originated from.

Standards for Glass Analysis

- Always submit samples of all broken windows / windshields / objects.
- The Trace Evidence Section will no longer routinely search objects/clothing for glass fragments without a proper glass standard(s) available. There may be scenarios where searching objects/clothing for glass fragments could be probative (i.e. hit and run fatalities). These would be analyzed on a case-by-case basis **only** with **pre-approval** (faxed request will not be considered pre-approval) of the Forensic Scientist Manager of the Trace Evidence Section (919-662-4500 ext. 3521) or the State Crime Laboratory Director (919-662-4500).
- Properly label each sample as a standard and specify where it was collected.
- If more than one window is broken, collect and package them separately. It is best to collect glass fragments still located in the window frame to ensure that the standard is from that window.
- If windshield glass is being collected, be sure to get both glass layers and label which was the outside/inside layer.

Collection of Glass Evidence

- The object used to break the window should be collected. DO NOT attempt to remove the glass fragments from the object.
- The clothing of the victim and/or suspect should be collected as soon as possible.
- Have the subject stand over a large piece of paper and carefully remove their clothing. Package all of the clothing along with the paper together in a paper bag or box.
- Glass fragments may also be found in the hair or skin of the subject and should be collected with the location noted.
- Shoes may be collected, but since they come into frequent contact with many sources of glass on the ground, they are not considered the best source of evidence.
- If the headlight casing on the suspect vehicle appears to be made of glass, it may be possible to match glass from the headlight casing to glass fragments found at the scene (see the "Physical Match" section below for collection instructions). Collect the entire casing and package so as to prevent further breakage.
- There are cases in which an architectural window may be reconstructed to determine direction of force and order of impact (see the "Physical Match" section below for collection instructions.)

Packaging of Glass Evidence

- Glass evidence must be packaged carefully and sealed so that small fragments do not escape through small holes or cause injury to those handling it.
- The best packaging material for glass is metal tins, boxes, or manila envelopes. Make sure to label the item with the location it was found.
- Large Pieces:
 - Do not use envelopes for large pieces of glass. Wrap each large piece separately in cardboard and package tightly to prevent breakage.
 - If an entire window is being submitted, the best way to package it is in a flattened cardboard box with all the sides sealed.
 - Hand delivering the evidence is best.

Physical Match Analysis of Glass

- Some types of glass products fracture into fragments which may be physically matched together like a jig-saw puzzle. The examiner fits the pieces together by microscopically matching stress lines and breaks to positively identify the pieces as having been broken from a single pane, bottle, or headlight/taillight.
- Bottles and headlights/taillights:
 - Make sure to collect as many fragments as possible, as well as any possible sources of the glass.
 - If significant portions of a bottle or headlight/taillight may be found and fitted together, leads concerning the type and manufacturer may be developed.
- Architectural windows:
 - It is best to collect the entire window with the frame. Make sure to mark on the frame which side of the window faced the inside/outside of the structure before removing it from the structure. Take care not to cause pieces to fall out while packaging.
 - Collect and package the broken glass fragments from inside the structure separately from those outside the structure and submit them with the window frame.

Glass Fracture Analysis

- Glass fractures form unique patterns, and examinations may result in valuable information as to the direction of breaking force or order of impact.
- *Direction of force:* Penetration of glass panes by bullets or high-speed projectiles produces a cone pattern from which the direction may be determined. Mark undisturbed pieces in the window as to “inside” or “outside” and submit all available glass so that enough pieces may be fitted together to identify the radial cracks near the point of impact and the point of impact itself. The direction of breaking force cannot be determined from tempered glass or very small panes of glass. Laminated glass, such as windshields, presents special problems. If possible, submit the entire windshield.
- *Order of impact:* This type of analysis is most common with windows that have been shot several times. If enough pieces are physically matched together, it is possible to tell which bullet impacted the window first. This cannot be done for tempered glass.

PHYSICAL MATCH EVIDENCE

Scope of Analysis - Physical Matches

- The physical matching of one piece of evidence to another may establish that two items were once joined as one.
- If an article is randomly separated into two or more pieces during the commission of a crime, a jigsaw fit of the edges may show conclusively that the pieces were once joined.
- If a jigsaw fit is not possible, the pieces will be examined to determine if there are any corresponding features on the pieces that may be used to show that the pieces were once joined.

Collection and Packaging of Physical Match Evidence

- Collect the two (or more) pieces to be compared with great care to avoid further fracture.
- Do not attempt to physically match the pieces prior to submission to the Laboratory, as this may contaminate the evidence.
- Protect the pieces from damage in storage and in transport. For large or unusual items, call the Trace Evidence Section for instructions.

GUNSHOT RESIDUE EVIDENCE

Gunshot Residue Kit collected from the Hands

- When a firearm is discharged, three elements associated with gunshot residue - barium, antimony and lead - may deposit on the hand or hands of the person firing the gun. By measuring the concentrations and distributions of these elements on an individual's hands, as well as identifying characteristic gunshot residue particles that are present, the examiner attempts to determine if the subject could have fired a gun or been in close proximity to a firearm when it was discharged.
- The collection of gunshot residue from the hands requires the use of a Gunshot Residue Collection Kit that utilizes both adhesive lifts and cotton swabs (combination kit). **Gunshot Residue Collection Kits that only contain cotton swabs will not be analyzed.** Contact the Trace Evidence Section for a list of current vendors that offer NCSBI approved collection kits.

Collection of Gunshot Residue Kits

- The collection of gunshot residue should be conducted in accordance with the instructions provided in each gunshot residue kit.
- It is strongly recommended that only individuals who have been properly instructed in GSR collection procedures conduct this test.
- When using the combination style kits, **first**, use the stubs with adhesive surfaces to collect residue for particle analysis.
- **Second**, utilize the cottons swabs moistened with 5 % nitric acid for bulk analysis. This second part of the GSR collection is only to be performed **after** sampling with the adhesive stubs. It should be noted that **TWO** swabs should be used on each area of the hand (Two swabs for the control, two swabs for the left back, two swabs for the left palm, two swabs for the right back, and two swabs for the right palm).
- To avoid delay, provide all of the information requested on the data sheet enclosed with the GSR kit. On the rare occasions when required information cannot be provided, please indicate that on the data sheet.
- Give special attention to the “Final Instructions” portion of the “Instructions for Collecting Gunshot Residue” form.
- NOTE: In control test firings, it has been shown that the concentration of gunshot residue significantly declines after approximately 4 hours. In view of these findings, the State Crime Laboratory will not analyze samples taken more than 4 hours after the shooting from live subjects conducting normal activity.

GSR from Clothing and Other Surfaces

- This analysis is designed to determine the presence of characteristic gunshot residue particles on items that were near a firearm when it was fired. For instruction on this type of evidence, contact the Laboratory or your district SBI crime scene agent.
- Clothing for muzzle-to-target distance determination (i.e., having bullet hole(s) and/or shotgun pellet patterns) goes to the Firearms Section for analysis. The Trace Evidence Section does not analyze clothes from the victim of a gunshot wound.

ACCELERANT EVIDENCE

Scope of Analysis - Accelerants

- In many illegal burnings and arsons, petroleum products and chemicals are used to start the fires and/or increase the burning rate and damage from the fires. A careful examination of the fire scene by trained investigators may uncover points of origin, ignition sources, and accelerants.
- Suspected accelerant samples must be collected and preserved in proper containers to prevent evaporation and deterioration of the samples. Laboratory analysis of these samples may identify the accelerant used and support the investigator's finding that the fire was intentionally set.
- Site examination is particularly important in arson investigations since much of the evidence pertaining to possible cause is available only on-site. Arson examinations require highly specialized training and should be conducted only by investigators with appropriate experience.

Standards for Accelerant Analysis

- Comparison samples of liquids should be collected and packaged separately from debris samples.
- Control debris samples should not be taken from the fire scene unless they are requested by the State Crime Laboratory.

Collection of Fire Debris Samples

- For most fires, request assistance from the Fire Marshal, SBI arson investigators, or the State Crime Laboratory.
- Guidelines to be used when collecting fire debris samples:
 - Photograph the entire fire scene before removing any items. Give particular attention to suspected areas of fire origin.
 - Search for unusual odors and burn patterns which may lead to the point of origin. Samples should be collected from these areas even if accelerant odors are not present and submitted for accelerant analysis.
 - Collect samples that are approximately the same size or volume as the container. For metal paint cans, the sample collected should fill approximately three fourths of the can. The headspace that is left at the top of the can is needed for extraction purposes.
 - Do not place disposable gloves that were utilized in the collection of the evidence in the container with the collected sample.

Collection of Liquid Samples

- Liquid samples should be removed from large containers and put into smaller ones before submission to the Laboratory.
- Seal liquid samples in small glass or metal containers.
- Be sure to collect liquid samples from the top layer of the liquid, as the bottom layer of liquid is usually water.

Packaging of Fire Debris Samples

- Samples should be packaged in airtight containers to prevent evaporation.
- Clean cans (new lined paint cans), glass jars, and nylon bags are the best containers.

DO NOT use paper or plastic (zip lock) bags.

- Containers may leak if not properly sealed. Be sure to clean the rim groove before placing the lid on a can. Completely seal cans and jars, and tape or heat-seal nylon bags. If you smell your sample when squeezing the container, the seal is not airtight.
- Be careful when selecting the type of container for the evidence. Sharp edges will easily puncture nylon bags, resulting in the evidence not being capable of being analyzed.
- Make sure the outside of the evidence is cleaned. Fire debris remaining on the outside of a metal can cause the can to rust from the outside in, allowing for leakage or cross-contamination between samples. Samples in rusted containers will not be analyzed.
- In samples where an accelerant odor is not detected, a DFLEX device, if available, may be added to the debris sample at the scene before sealing the container. This device adsorbs accelerants from the sample and reduces the chance of evaporation. **Follow the manufacturer's instructions when using DFLEX.**
- Suspicious containers found at the fire scene should be collected and if possible sealed with a lid or stopper. These containers should then be sealed in nylon bags.

Submission of Fire Debris Samples

- **Samples should be submitted promptly (ASAP) to prevent loss of accelerant.**
- When alcohols are suspected, this must be indicated on the "Request for Examination of Physical Evidence" form as additional testing is required.

PEPPER SPRAY EVIDENCE

Scope of Analysis - Pepper Spray

- Oleoresin Capsicum (pepper spray) canisters are routinely analyzed to determine the amount of pepper spray remaining in the canister and the functionality of the canister.
- Clothing may also be analyzed for the presence of pepper spray.

Submission of Pepper Spray Evidence

- Submit all of the canisters used in the incident under investigation.
- Submit a minimum of one **unused** canister of the same brand, size, and type with the same label as the questioned canister (usually taken from another officer). This is required for comparison. If another canister is not available, please contact the analyst ahead of time. Submission of an unused canister is mandatory if clothing analysis is requested.
- Submit any product information sheets or pamphlets available that describe the type of pepper spray being submitted.

METAL EVIDENCE

Scope of Analysis - Metals

- Metals may leave chips, filings, or smears when they come in contact with other hard surfaces such as tools.
- Tool marks occur readily on most metals and may provide positive proof of tool-to-metal contact. Please contact the Crime Laboratory's Firearm and Tool Mark Section for tool mark analysis requests.

Analysis

- Physical matches may be attempted with larger fragments.
- Smaller metal samples may be analyzed to determine the base metals and impurities or alloys that make up the particles.

Submission of Metal Evidence

- When submitting metals particles for elemental analysis and comparison, the suspected source should be submitted along with the questioned metal particles.

EXPLOSIVES EVIDENCE

Scope of Analysis – Explosives

- Site examination is particularly important in explosives investigations since much of the evidence pertaining to possible cause is available only on-site. Explosives examinations require highly specialized training and should be conducted only by investigators with appropriate experience.
- In the event of bomb threats or to recover undetonated explosives, including homemade explosives, propellants, or high explosives, **request assistance from the SBI Hazardous Devices Unit (1-800-334-3000).**
- In post-blast situations, state and local law enforcement agencies may request crime scene assistance or expertise from the Trace Evidence Section of the State Crime Laboratory.

Categories of Explosions

Diffuse Explosions

- Includes explosions of gas mixtures, dusts.
- Mixing illuminating gas or the fumes of gasoline, ether, benzene, or other inflammable gas or vapor with air in proper proportions creates a highly explosive environment that may be ignited by a pilot light, match, spark, or any other local high temperature.
- Only occurs when the composition of the gas mixture is within the explosive range.
- An unduly high concentration of either of the component gases as compared with the other, however, will not be likely to provoke an explosion.
- Dust explosions are very similar in nature to explosions of gases and vapors.
- Occur over a relatively wide area.
- Diffuse explosions generally result in erratic damage, blowing objects in random directions rather than in a definite and simple pattern.
- Diffuse explosions tend to blow exterior walls outward, crumple interior walls and deposit fragments in several directions.
- Diffuse explosions generally do not provoke local shattering and do not create a crater or area of special damage or discoloration.
- Ordinarily of an accidental nature.

Concentrated Explosions

- Includes explosion of ordinary explosives such as black powder, dynamite, and nitroglycerine which themselves constitute a complete explosive system.
- Concentrated explosions generally result in a violent rearrangement of elementary constituents and produce large volumes of gas which is heated and expanded by the heat of the reaction.
- Originate at a point.
- All forces radiate from the point in three dimensions. Studying the pattern of an explosion may thus be important in determining the nature of the explosive material.
- More likely to be deliberate.

Collection of Post Blast Evidence

- **Exercise care in moving about the site because secondary hazards (i.e., exposed electrical lines, ruptured gas lines, improvised explosive devices [IEDs] etc.) may be present.**
- Origin determination
 - If a diffuse explosion is suspected, attempt to determine its origin.
 - If the use of an IED or explosive ordinance is suspected, attempt to locate the seat of the blast (point of detonation). This is usually determined by characteristic cratering or areas exhibiting the most extreme physical damage.
- Photograph and/or sketch the overall site and the presumed point of origin/seat of the blast.
- Search carefully for the remains of fuses, wires, batteries, containers (i.e. pipes, bottles), and possible timing or triggering devices.
- Collect samples of the debris which has apparently been blown away from the presumed point of origin/seat of the blast and fragmented into small pieces. Metal, wood, and glass are the best materials for examination.
 - Collected samples should be packaged in airtight containers to prevent evaporation or spread.
 - Clean cans (new lined paint cans), glass jars, and nylon bags are the best containers.
- Provide photographs and a crime scene sketch along with the items submitted for analysis.

Collection of Pre-Blast Evidence

- When bulk explosives, military ordinance, or IEDs that have been rendered safe are recovered, the Trace Evidence Section of the State Crime Laboratory should be contacted prior to submission.

SUSPICIOUS WHITE POWDER EVIDENCE

Collection of White Powders

- Exercise care in the collection of suspicious white powders. The number one goal in the collection of this evidence is to contain and reduce accidental exposure to the substance.
- Utilize personal protective equipment to avoid exposure.
- Coordinate with the local health department or Public Health Regional Surveillance Team to determine if there is a credible biohazard threat. **If the suspicious white powder is thought to be biological in nature, contact the FBI Charlotte Field Office at (704) 672-6100 or the NC SBI at (919)662-4500 to initiate the HAZ-MAT response.**

Packaging of White Powders

- All suspicious white powders should be packaged in “generalized triple packaging” as specified by the CDC for shipment of biological agents. This packaging consists of an inner sample biohazard bag or glass vial, an inner leak proof poly bag, and an outer Tyvek envelope.
- **DO NOT USE PAINT CANS.**

Submission of White Powders

- The suspicious powder must be submitted to the N.C. State Lab of Public Health first to ensure that it is not biological in nature. **Contact the Bioterrorism and Emerging Pathogens Unit at (919) 807-8765 (Main Number) or (919) 807-8600 (24 hours a day).**
- Once the material has been analyzed by the Bioterrorism and Emerging Pathogens Unit and deemed to be non-biological in nature, the powder may then be submitted to the Trace Evidence Section of the State Crime Laboratory for identification. **The Public Health Department report showing the non-biological nature of the powder must be included with the Crime Laboratory submission paperwork.**

DIGITAL EVIDENCE SECTION

The Digital Evidence Section is responsible for the forensic examination of audio, video, and computer evidence. The Graphic Arts Unit is also a part of the Documents and Digital Evidence Section.

Digital Evidence Unit

Evidence is submitted for digital evidence examination in cases such as missing and exploited children, abduction cases, child pornography, homicide, financial crimes, terrorism, etc.

Types of Analysis Performed by the Digital Evidence Unit:

- Computer Forensics

Examination of computers and digital media

Examination of electronic storage devices (cell phones, digital cameras, etc.)

- Video analysis
- Audio analysis

Computer Forensics

Case Acceptance Criteria

Personal computers, cell phones, CDs and other removable media, digital cameras, tapes and other storage media found at crime scenes may contain vital evidence that may be examined, retrieved and saved by our forensic examiners. The Laboratory will accept computer forensic examination requests relating to the following incidents:

1. Crimes against children, e.g., child pornography, child abduction, sexual assaults against children, child molestation and traveling to meet a child for the purpose of sexual relations;
or
2. Violent crimes, threats of violence or terrorism wherein a computer search may provide evidence of such crime, e.g., homicide, rape, or serious assault.

Collection of Computer Evidence

Caution should be used in the collection of computer evidence due to the volatile nature of this technology.

- If the computer to be seized is “off” at the time of discovery, **do not turn it on** or attempt to determine what evidence may be on it. By turning on the computer, you may alter the dates, times and files, thus changing and/or destroying evidence.
- If the computer is “on,” save any file or files that are open at the time the computer is seized to a separate diskette or USB storage device and pull the plug from the back of the CPU. Clearly mark and submit the diskette or USB storage device to the Laboratory at the same time as the computer.

Note: If you are uncomfortable with computer operations or do not understand their operations, seek assistance from the SBI Field Computer Crimes Unit or a knowledgeable crime scene specialist.

- Any relevant computer manuals or software located at the scene shall also be collected and may be submitted to the Laboratory as items of evidence at a later date if needed.
- At the time of the crime scene search, it is imperative to search, with proper legal authority, the area extensively for passwords. They may be jotted down on a desk blotter, a post-it note, or posted anywhere near the work station. Without them, data may be inaccessible.
- When seizing electronic devices such as cell phones and PDAs, be sure to look for and seize any power cords, changers, or cables to charge the batteries in these devices or to connect these devices to computers.
- For cell phones, if the cell phone is off at the time of seizure, leave the phone turned off. If the phone is on at the time of seizure, turn the phone off. If possible, remove the battery from the phone and submit with the phone.

Computer Forensic Submission Requirements

It is recommended that all computers be hand delivered to the State Crime Laboratory. Shipping computers to the Laboratory may unnecessarily subject them to rough handling, heat, or electric and magnetic fields, all of which could increase the risk of damage to the evidence stored on the computer.

Fill out the “Request for Examination of Physical Evidence” form (SBI-5) supplying all information requested.

Complete the SBI-5 Supplemental questionnaire. All computer forensic submissions **must** be accompanied by this portion of the form. Be sure to answer the questions in depth in order for the examiner to understand the request and provide a productive file search. Due to legal issues, it is **imperative** to tell us under what lawful authority the evidence was seized and provide us with a copy of this documentation, i.e. court order, search warrant, etc.

Cases involving digital evidence, such as computers, should be packaged with anti-static bags or paper packaging. Due to static electricity, computer evidence should not be packaged in plastic. Be careful not to expose this type of evidence to magnetic fields. Magnetic fields are present in two-way radios, police equipment, scanners, speakers, stereo equipment, etc. If available, the computer should be packaged in the original box (from the scene) or equivalent. Anti-static foam padding or crumpled paper (such as newspaper) may be used to prevent shifting during transport.

Computer media should be packaged separately in evidence envelopes or bags and identified with sequential item numbers that represent an accurate inventory of the items being submitted.

Example (SBI-5 Form):

Item #1: Box containing one Digital PC 5000 computer processing unit.

Item #2: Paper bag containing five (5) floppy disks and one (1) CD-Rom.

Item #3: Paper bag containing one Nokia cellular phone.

Be aware items of evidence that have volatile memory or are battery operated, i.e. PDAs, will lose all data if batteries are allowed to discharge completely; therefore, devices with removable batteries (AA, AAA) should be submitted with new batteries installed and the device should always be turned **OFF**. The new batteries must be inserted immediately upon removal of the old batteries. PDAs with rechargeable batteries should be recharged using the type of charger provided with the device. Upon submission of this type of evidence to the Laboratory, advise the receiving Evidence Technician that the evidence has volatile memory and the date the batteries were replaced or recharged.

As with all evidence accepted by the Laboratory, containers must be adequately sealed and initialed by the person sealing the packages.

In most cases, computer evidence will not be returned to your department by mail or commercial carrier. Due to limited storage facilities at our Laboratory, we must ask for your cooperation in picking up computer evidence as soon as you are notified that your evidence is ready to be returned.

Items permissible for submission include:

- Laptop computers/PDAs
- Desktop Computers
- Digital cameras (including storage media)
- Cellular telephones/Smartphones
- Media (disks, floppies, etc.) regardless of what they are labeled
- Any passwords, user ID's, or screen names found at the scene shall be submitted.

Do NOT Submit:

- Computer displays/monitors
- Keyboard, mouse, or other accessories
- Printers, Speakers

Video Analysis

Video tapes from surveillance cameras may be enhanced to improve the quality of the images, or to slow down time lapse surveillance video and produce a video that may be viewed at a normal speed.

Images on videos may be captured and converted to still photographs.

When submitting video evidence, carefully package it to prevent damage during shipment. On the evidence submission form indicate in some manner the area of the video that you are interested in. This may be indicated by listing the time in hours, minutes and seconds; or, describing the person you are interested in viewing.

Analog Video

When locating the area of interest, avoid pausing or overplaying analog video. Excessive playing and pausing of the analog video (ie. VHS videotapes) may cause serious degradation of the video quality. For analog tapes, the write-protection tabs should also be removed before viewing the video in order to prevent accidental erasure of the evidence.

Digital Video

For cases involving digital video (video recovered from a DVR system), the original video files as they are stored on the system should be recovered from the DVR system to get the best quality video. To get the best results possible, be sure that when exporting the video from the DVR system for analysis, the video is exported with NO compression. Many DVR systems store video in a proprietary format. When exporting video from the DVR, download the proprietary video player with the video if at all possible. Write protect media containing the exported video and video player if possible.

Return of Video Evidence

In a standard video examination, the results will be returned as a CD containing the still images of interest and a VHS videotape documenting the steps used in the analysis. Please note on the SBI-5 submission form if you wish to receive the results in an additional format (ex. DVD-video, uncompressed Quicktime files).

NOTE: Success in video enhancement is largely dependent on the quality of the surveillance video, camera placement and the lighting of the surrounding area. Video that is captured out of

focus or in shadows will limit the amount of enhancement available.

Audio Analysis

Audio tapes may be enhanced to improve the clarity of the recording. Unwanted interference and noise may be filtered out. When submitting audio evidence, carefully package it to prevent damage during shipment.

Graphic Arts Unit

The Graphic Arts Unit provides support to SBI Agents, Administration, all law enforcement agencies, other state agencies and district attorneys throughout North Carolina.

Types of Services Performed by the Graphic Arts Unit:

- Crime scene reconstruction sketches (2D & 3D)
- Courtroom exhibits
- Diagrams, Charts, Time lines
- On-site crime scene reconstruction
- Crime Zone Software Training
- Suspect Target Boards
- Photo Line-Ups
- Wanted / Missing Persons Posters
- Special projects

Submission requirements:

Work orders should be accompanied by an **SBI-124 Form (Graphics Unit Work Order Request)**. Work requests for diagrams should include **measurements**.

FORENSIC BIOLOGY SECTION

1. Services

Deoxyribonucleic Acid (DNA) is a chemical that contains the genetic material for all living organisms. DNA is useful for forensic investigations because it is unique to each person (except identical twins) and may be used for identification or exclusionary purposes. The Forensic Biology Section assists in the investigation of a wide range of cases including homicide, rape, kidnapping, breaking and entering and assault cases. Services provided from this Section include the identification of the body fluid (blood, semen or saliva), DNA typing tests and crime scene assistance of luminol. If crime scene assistance is needed, the request should be channeled through the local SBI district office.

Y-STR Testing

The section performs Y-STR testing in sexual assault and homicides cases. Y-STR markers are found on the male-specific Y chromosome and are inherited through the paternal line. As a result, males related through paternal lines will have the same Y-STR type. Therefore, this testing is not as specific as the traditional, "autosomal" STR typing. Oftentimes in sexual assault cases there is a combination of the male and female's DNA. Sometimes the male and female components cannot be separated out or the female's DNA is at a much higher concentration than the male's DNA. So the main advantage to male specific Y-STR typing is that any female component in the evidence is not observed, leaving the male DNA profile. The section does not currently perform Y-STR testing. Laboratory analysts can be contacted to assist in evaluating evidence for Y-STR analysis. Analysts can also aid in identifying laboratories which can conduct this type of testing.

Mitochondrial testing

The Section does not perform mitochondrial testing. If this type of testing is needed, contact the FBI for submission to one of its regional labs.

Fingernail Evidence

The Forensic Biology Section often gets requests to obtain DNA profiles from fingernail scrapings. The person collecting this type of evidence should look for loose tissue under the fingernail. If a clump of tissue is found, the tissue may be collected with a sharp pair of unused or sterile tweezers. Place this material in a paper fold. Then place this into a sealed container and label it appropriately.

Fingernail scrapings or clippings may be collected, but are not normally analyzed by this laboratory. Under certain circumstances, scrapings or clippings may be analyzed after speaking with the Section Manager.

Fecal Material

The Section has no test to identify fecal material; however DNA analysis will be performed under the following conditions: DO NOT package the material as is and submit to the lab. DNA testing will be performed on swabbings from the outer layer only. Do not collect a swabbing if the fecal material is in water or non-formed. Allow the swabbing to air dry thoroughly before submitting.

Vaginal Secretions, Urine and Sweat

The lab has no test to identify vaginal secretions, urine or sweat. DNA analysis will be performed on a case by case basis.

“Touch” DNA Samples

The Section performs analysis on “touch” DNA cases. Touch DNA is defined as evidence that has no visible staining and could contain DNA only as a result of touching an item with the skin. Touch evidence does not include cigarette butts, swabbings from cans, bottles, straws or other items in which the substance being tested is most likely saliva or items submitted from the wearer such as shirts, shoes, hats, etc. where there is probability of prolonged contact. Touch DNA typically includes the swabbing of surfaces to include door knobs or handles, money credit cards, phones etc. Touch DNA samples must have the appropriate standards submitted, for example, in submitting touch samples in the burglary of residence, standards from the occupant must also be submitted. Since all standards cannot be collected from business property crimes, the Section will not accept these types of cases.

2. Collection, packaging and storage of Evidence

Avoid directly touching the evidence with bare hands or introducing body fluids that contain DNA to the evidence. Saliva and mucous produced by coughs, sneezing, or even talking over the evidence may introduce enough DNA to contaminate the evidence.

Avoid excessive heat, humidity, temperature fluctuations and damp conditions by maintaining evidence under environmentally controlled conditions such as an air conditioned/heated building or room. If transporting the evidence place the evidence in a climate controlled portion of the vehicle if possible.

Always allow DNA evidence that is wet or that contains liquid body fluids to dry before storing. Store evidence in breathable containers (i.e. paper or Tyvek envelopes, cardboard boxes, but NOT in plastic) to avoid condensation.

Package each item intended as a separate piece of evidence separately; i.e., victim’s clothing in one container, suspect’s clothing in a second container, etc.

Always package evidence in paper. Never use plastic bags.

Pad fragile and sharp articles so that they will not break or penetrate the packaging.

Store evidence in a cool and dry location.

Clothing

If clothing is wet, lay the clothes out flat until dry; do not fold while wet. Submit the entire article of clothing. If the clothes must be cut off, never cut through existing holes such as knife or gunshot holes.

Wet Stains

If the entire item may be collected, do so. Air dry the item thoroughly before packaging it in a paper container. Do not apply heat to dry an item. If a wet stain is present and the whole item cannot be seized, the stain should be removed using a clean sterile cotton swab. Swab the stain until the stain is no longer visible or until the swab becomes saturated with stain. If possible,

collect at least two swabs. Collect the stain on the very tip of the swab until the swab tip is dark in color.

Dry Stains

The best choice is to collect the entire article; however, there are times when this is not practical. If a stain must be cut out of an article such as carpet, cut the ENTIRE stain. If multiple areas are being cut out of an article, clean the cutting instrument before going to the next area to avoid cross contamination. If an article cannot be removed entirely or cannot be cut, the sample may be absorbed onto sterile swabs. Place a drop of sterile water on the swab and shake the swab to remove excess water. Swab the stain on the very tip of the swab until the swab tip is dark in color or the stain is no longer. If possible, collect at least two swabs. If the sample is very small, be very careful not to dilute the sample.

Sexual Assault Cases

- Take the victim to the hospital as soon as possible to have a Sexual Assault Kit collected. Advise the victim to not clean up prior to going to the hospital. Evidence could be lost by allowing them to clean up. The panties that will be collected in the Sexual Assault Kit are those that are worn after the attack. The pair removed before the assault is not where the potential forensic evidence will be found.
- If a suspect is identified, a DNA sample may only be collected pursuant to lawful authority such as consent, a non-testimonial identification order (pursuant to N.C.G.S. § 15A-271), or a search warrant for adult offenders. For juvenile offenders, a sample may be collected pursuant to a non-testimonial identification order N.C.G.S. § 7B-2105(b). The SBI Subject Collection Kit should be used to collect this sample. Collect samples according to the instructions packaged within the kit.
- Additional articles which may bear body fluids and hairs may be collected by law enforcement. Remember that the hair must be removed from these articles if you wish to have hair analysis done in the case. Do not submit the suspect's clothing for semen analysis. Finding the suspect's semen on his own clothing does not have forensic value since it may be legally deposited there at any time. However, if the victim is bleeding, suspect's clothes should be analyzed for victim's blood.

Cigarette Butts

Pick the butts out of the ashes and place in an envelope (multiple butts in an ash tray should be placed in the same envelope). If the victim or suspect is a smoker, determine his/her brand preference, if possible, and indicate it on the envelope or submission sheet.

3. Standards

Known blood standards or cheek scrapings should be collected from all relevant people involved in the case. A proper blood standard consists of ONE lavender (EDTA) stopper blood tube OR a dried blood stain. A proper cheek scraping consists of 2 sterile swabs rubbed vigorously on the inside of an individual's cheeks. If an individual did not bleed, but his/her clothes are being sent in for comparison purposes, his/her DNA standard should also be sent for elimination purposes as his/her DNA may be present from saliva or skin cells.

The liquid blood samples should be kept under refrigeration prior to submission to the lab. Never

freeze liquid blood samples.

Submit the dried bloodstain prepared by the medical examiner from the autopsy.

Alternate Standards

If no blood sample is available due to complete exsanguination (loss of blood), or if an individual has been transfused within two weeks, an alternate standard may be obtained which may include:

- If the individual has been transfused but is still alive, collect a buccal swab (cheek scraping) standard.
- An article of clothing (with chain of custody intact) that is stained with what must be considered to be the subject's blood.
- If the corpse has bled out or is decomposing, ask the pathologist for 2-4 teeth (preferably molars without dental work). If they are not available, request a 3-6 inch section of compact bone (femur). Bone material that is still attached to tissue must be frozen prior to submission to the lab and be hand delivered. Please note that human tissue or bones cannot be destroyed or disposed of without a court order. This is the responsibility of the submitting agency.

4. Case Acceptance/Submission

Please submit only evidence that is relevant to the case. The purpose of testing is to establish a transfer of body fluids (DNA) between the victim and suspect and/or crime scene. An example of irrelevant evidence might include looking for the victim's blood on his own clothing or the suspect's semen on his own clothing.

The depth and scope of examinations selected by the analyst for a given case depends to a large extent on the amount of information provided by the submitting officer. It is imperative, therefore, to include a complete description of the crime on the second part (Part B) of the Physical Evidence Examination Request Form (SBI-5) or to attach a copy of the investigative report.

Analysts need to know for example:

- How many people could have bled.
- What the officer believed happened.
- Victim's and suspect's statement.
- What, if any, unusual circumstances may have affected the stains such as soaking, heating or contamination.

Complete information is also essential in making determinations in sexual assault cases as to the donor of any semen detected. Since one is dealing in these cases with a mixture of body fluids from at least two individuals, the analyst **MUST** know if the victim had sexual intercourse with any other individuals in the 72 hours prior to the assault. If so, an elimination standard must be submitted. Other important information includes:

- 1) Did the assailant ejaculate;
- 2) Did he wear a condom;
- 3) What body cavities did the assailant penetrate;
- 4) Was oral sex involved (who on whom);
- 5) Did ejaculation take place outside the body, and if so, where was the semen deposited;
- 6) Does the suspect deny having sex with the victim?

Many of these questions must be answered before analysis may be completed.

DNA will only be performed on cases where the identity of the assailant is in question; consent cases will only be worked at the request of the DA's office.

The State Crime Laboratory does not conduct **paternity** testing even if criminal charges are pending (i.e. the child was conceived as the result of a rape). By extension, we do not perform reverse paternity testing which would occur when one is asked to determine if a body or sample could be the result of a set of biological parents.

All cases, with or without suspect standards, will be routinely examined through Body Fluid identification. All cases with suspect standards will be routinely examined through DNA analysis. All no suspect crimes, (except certain property crimes described below) will be accepted for DNA analysis as long as all elimination standards are submitted. In order for a no-suspect property crime to be accepted for DNA Analysis it must be a felony or serial in nature.

CODIS REQUIREMENTS

Only items of evidence directly attributable to a suspect may be uploaded to the national level of CODIS. If information cannot be provide that reasonably links a particular item to a crime the resulting profile will not be placed into the CODIS database.

5. Safety Considerations for Biological Evidence

Always assume that unknown samples may be infected and handle the evidence accordingly. Always follow universal precautions. Use clean gloves; do not smoke, drink or eat until after removing the gloves and washing hands; do not agitate the stain and avoid flaking off fine particles that float in the air.

6. Post-Trial Storage of DNA Evidence

As a chemical, DNA is relatively stable. However, there are environmental factors that may damage the DNA by breaking it down into smaller pieces. When storing evidence that might contain DNA (DNA evidence), the environmental factors that might lead to DNA degradation may be negated by maintaining the evidence in a dried state (therefore preventing microbial degradation) and preventing direct exposure to light. If evidence containing DNA is packaged correctly and stored under the right conditions, it will be stable and therefore useful for forensic identification indefinitely. Researchers have reported isolating DNA from ancient Egyptian mummies and from prehistoric insects preserved in fossilized Amber. The State Crime Laboratory has successfully examined forensic cases where the DNA evidence was stored in excess of 20 years.

General Statute §15A-268 states “a custodial agency shall preserve any physical evidence that is reasonably likely to contain any biological evidence collected in the course of a criminal investigation or prosecution. Evidence shall be preserved in a manner reasonably calculated to prevent contamination or degradation of any biological evidence that might be present, subject to a continuous chain of custody, and securely retained with sufficient official documentation to locate the evidence.” For the required length of time of storage of such evidence, refer to General Statute §15A-268. In accordance with this statute, Law Enforcement Support Services (LESS) has created a long term storage facility to alleviate the shortage of storage space in law enforcement evidence retention areas. This warehouse is a secure facility with certified evidence technicians maintaining chain of custody. This facility is available to all law enforcement agencies. For further information call (919)-773-2823.

- For long term storage, DNA evidence that contains tissue, bone, teeth, hair roots, etc should be frozen in a NON-Frost free freezer if possible. The freeze thaw cycle may damage the DNA. All DNA evidence may be frozen, but do not use a Freezer that has a “defrost” cycle. Exhumed bone that is extremely old and dried as well as teeth may be stored at room temperature.
- Sexual Assault Evidence Collection Kits (SAECK) should be stored at room temperature. Any SAECK currently in a refrigerator should be placed in a climate controlled room. All items inside the kit are dried and more stable at room temperature. Refrigeration may cause deleterious condensation on evidence inside the SAECK.
- Liquid blood samples should be stored under refrigeration before submission to the State Crime Laboratory. Once the Laboratory has processed the liquid blood, the liquid blood may be stored at room temperature.

7. NCSBI DNA Database

The State of North Carolina enacted General Statute 15A-266 on December 1, 1993. This statute requires the State Bureau of Investigation to receive, analyze and store DNA profiles of convicted violent criminals. In December of 2003, this statute was amended to include all convicted felons. General Statute 15A-266.3A, which became effective February 1, 2011, made two significant changes to the state's laws on DNA collection: (1) DNA samples will be collected from persons upon arrest for specified offenses, and (2) the general method of sampling is changed from blood sample to cheek cell collection for DNA collection. Collection will be performed using the SBI standardized DNA Database Collection Kit. DNA Database Kits are distributed by the SBI DNA Database Unit upon request to all law enforcement agencies.

DNA Database samples should be submitted to the NCSBI DNA Database Unit, either by U.S. Mail or by personal delivery. Sample Inventory Forms must be completed for all samples submitted from the North Carolina Department of Corrections and sent with the corresponding samples to the State Crime Laboratory DNA Database Unit. Sample inventory forms will be retained indefinitely.

The DNA profiles obtained from convicted offenders and arrestees will be entered into a computer database known as CODIS (Combined DNA Index System).

As of October 2010, the State Crime Laboratory had over 224,000 genetic profiles in its DNA database. Although approximately 201,000 of these profiles are convicted offenders and approximately 3,000 of these profiles are arrestees, the State Crime Laboratory also maintains genetic profiles from suspects, forensic unknowns, missing persons and unidentified remains. The State Crime Laboratory DNA Database Unit is linked to other state and federal labs using CODIS (Combined DNA Index System) which combines forensic science and computer technology into an effective tool for solving crimes. CODIS enables state and local crime laboratories to exchange and compare DNA profiles electronically, thereby linking unsolved crimes to each other and to convicted offenders.

If a CODIS "hit" is obtained between an unsolved case and a North Carolina convicted offender or arrestee, State Crime Laboratory DNA database analysts will reanalyze the convicted offender or arrestee sample to ensure that the profile obtained is concordant with the profile in CODIS for the subject. A latent analyst will verify the identity of the finger prints on the DNA Database Collection Card submitted with the subject's DNA database sample. Also, for convicted offenders and arrestees, State Crime Laboratory personnel will determine the incarceration status of the subject on the date of offense in question and the current location of the subject.

Once all verification procedures have been completed, the officer who submitted the case will be notified as to the identity of the convicted offender or arrestee. This information may only be used as probable cause to obtain a search warrant for a known DNA standard from the subject. If requested, State Crime Laboratory personnel (sworn agents) may assist in the writing and serving of the warrant for the DNA standard.

If an officer has a case in which he/she lacks sufficient probable cause to obtain a known DNA standard, he/she should determine if the State Crime Laboratory has the subject's DNA sample on

file as a convicted offender or arrestee sample in the DNA Database. To verify if a subject's arrestee sample is on file, please call the DNA Database Unit at 919-662-4509 ext 2275. To verify if a subject's convicted offender sample is on file, the officer may use the Computerized Criminal History (CCH) files to check for the DNA flag that states "DNA available at the NC SBI Lab: YES or NO."

NOTE: If the DNA Flag is marked as "Yes" this only indicates that a convicted offender DNA sample has been collected from this individual. It DOES NOT indicate that the individual's genetic profile has been entered into the DNA database. If a subject has a convicted offender DNA sample on file within the DNA database it is not necessary to collect an additional arrestee sample for this individual. If the officer performing the collection has any questions concerning whether to collect an additional specimen, then the officer should contact the Forensic Biology Section at 919-662-4500.

If the officer wishes to submit evidence for comparison to a convicted offender or arrestee sample identified as being in the database, then the officer MUST contact the Forensic Biology Section at 919-662-4500 for permission to submit the case without a suspect standard. This option should ONLY be used for those cases where it is IMPOSSIBLE to get a known DNA sample from the suspect.

The standardized DNA Database collection kits are for offender/arrestee collection only and are not to be used in the collection and submission of victim or suspect standards.

FIREARM AND TOOL MARK SECTION

Capabilities and Services

- Determine whether a bullet, cartridge case, or shotshell was discharged from or in a particular firearm.
- Determine if a particular tool mark or tool impression was made by a specific tool.
- Determine if a broken part or piece of a tool or firearm was once a part of a particular tool or firearm.
- Determine if a gunpowder residue pattern is present on a given article (e.g., clothing, bed sheets, curtains), and, if present, determine how far a specific firearm muzzle was from the article at the time of firing.
(NOTE: this can only be preformed if suspect weapon and ammunition are available.)
- Determine muzzle-to-target distances for shotgun pellet patterns.
- Identify bullets and/or cartridge cases as to type, caliber, and possible manufacturer. Provide listings of type, make, or caliber of firearms that may have fired a particular bullet.
- Determine shot size, wadding, gauge, and possible manufacturer.
- Perform serial number restorations on firearms.
- Determine if a firearm functions properly and trigger pull weight.
- Provide assistance at crime scenes pertaining to forensic firearm and/or tool mark examination.
- Provide seminars and classes related to forensic firearms and tool marks.
- Perform automated checks of cartridge case evidence from unsolved crimes against firearms and evidence from other crimes using the Integrated Ballistics Identification System (IBIS).
(NOTE: The IBIS BRASSTRAX™ System in operation at the North Carolina State Crime Laboratory Firearm and Tool Mark Section does not accept entry of fired bullets.)
- Maintain a firearms reference collection.
- Maintain an ammunition reference collection.

Type of Analyses or Examinations

Firearm or Ammunition Cases

Bullets, cartridge cases, and shotshells are compared to a suspected firearm in the following manner: analysts fire test cartridges of the same manufacture, caliber or gauge, and bullet type or shot size from the suspect firearm. The test bullet, cartridge case, or shotshell is next compared microscopically with the submitted evidence bullet, cartridge case, or shotshell.

Tool Mark Cases

In tool mark examinations, analysts microscopically compare test tool marks made with a suspect tool to submitted tool marks. Generally, tool marks fall into two categories: impressions or striations.

Please note that it takes a considerable length of time to reproduce questioned tool marks with a particular tool. Therefore, do not submit a tool mark for comparison with a tool left at the scene of a crime unless the suspect tool may be tied to a suspected perpetrator through investigation.

Gunpowder Pattern Analysis

Gunpowder pattern analysis helps reconstruct aspects of a shooting, especially distance determination. Articles submitted for analysis are chemically treated with solutions capable of indicating the presence of nitrites from burnt gunpowder or lead particles and vapor. If a gunpowder pattern is located, the suspect firearm is test-fired at various distances using the evidence or similar type ammunition used in the crime. These test-firings produce standard test cloths. The gunpowder pattern on the test cloths that most resembles the pattern on the evidence provides an approximate muzzle-to-target distance at the time of firing.

Please note this testing can only be preformed if suspect weapon and ammunition are available and must be accompanied by a written request from the appropriate District Attorney, US Attorney, Judicial Official, or Federal/State Official and approved by the Forensic Scientist Manager of the Firearm and Tool Mark Section, Deputy Assistant Director or Crime Laboratory Director.

Firearm Serial Number Restoration

Obliterated serial numbers prevent investigators from tracing firearms. The serial number may have been filed, punched, or even treated with acid. An examiner may frequently restore an obliterated serial number through a number of physical and/or chemical processes. Once the serial number is restored, a weapon may be traced and a determination of whether it has been stolen may be made. For gun trace information, please contact your local Bureau of Alcohol, Tobacco, and Firearms (BATF) Office.

Integrated Ballistic Identification System

Integrated Ballistic Identification System (IBIS) is an automated computer system that captures the individual signatures of fired bullets and cartridge cases and stores them in a database. The system is designed to run correlations on these signatures to determine any possible matches. IBIS is part of the National Integrated Ballistic Information Network (NIBIN).

Please note that bullets are no longer being entered into IBIS.

Evidence Submission

Firearms evidence should be submitted to either the State Crime Laboratory in Raleigh or to the Western Regional Laboratory depending upon your department's location. **Please refer to Page 7 of this manual for a list of counties that are served by the Firearms Section in the Western Lab.**

Proper collection, marking and handling of firearm and tool mark evidence makes the examiner's work easier and ensures a more complete examination. Please observe the following general guidelines for proper collection, working, and handling of firearm and tool mark evidence.

Firearms:

- Never place anything into the barrel of a suspect firearm.
- If the submitting officer deems it necessary to have the firearm processed for latent prints, handle the firearm only by those areas that normally do not yield fingerprints (e.g, checkered grips, edges of the trigger guard, or any knurled area).
- If possible, carefully unload the firearm at the scene. On revolvers, it is a good idea to note which chamber was under the hammer and/or the location of discharged and live cartridges in relation to that chamber. On pistols and other firearms that load by magazine, remove the magazine and unload the live cartridges from the magazine.
- Use care in marking firearms. Usually the side plate of revolvers and the slide area of automatics are the best locations for identifying marks. Be careful not to destroy any trace evidence when marking a firearm. If the firearm is to be examined for latent prints, do not mark the weapon - place all necessary information on a tag and attach the tag to the weapon. If possible, record the serial number, make, and model of the submitted firearm in your notes.

- Collect firearms separately in a paper or plastic bag. Do not use plastic bags for firearms that are being submitted to the Latent Evidence Section, Trace Evidence Section, or Forensic Biology Section.
- Only submit loaded firearms when absolutely necessary - and then do so in person. Place loaded firearms in sturdy containers, not paper or plastic bags or envelopes, and tie them down to prevent movement. Mark the package - **Caution - Loaded Firearm**
- Submit firearms discovered in water **SUBMERGED** in a sample of that same water. Please use a water container that may remain with the firearm when submitted. Some examples of containers are screw-capped PVC pipe, old paint cans, and Tupperware-type containers.
- In circumstances where the firearm cannot be submitted, but test fires are available, contact the State Crime Laboratory Firearms Section for further instruction.

Bullets, Cartridge Cases, and Shotshells

- Collect all live ammunition at a crime scene for use as standards. **Only submit live ammunition of the same caliber as any firearms submitted. Contact the Firearm and Tool Mark Section if there are any questions.**
- Do not mark cartridge cases or bullets in any manner. Place them in individual envelopes and place all necessary identification data on the outside of these envelopes. This process prevents accidental marring of the important surfaces of the bullet and/or cartridge case and accidental destruction of trace evidence. All containers should be sealed and initialed.
- When collecting bullet, cartridge case, shotshell, and similar evidence at a crime scene, do not attempt to wash or clean the evidence.
- Do not place cotton or tissue around bullets, as this material may adhere to blood or other matter on the surface of the bullet.
- At autopsies, we request that pathologists attempt to clean blood or other body fluids off of the evidence prior to packaging.
- Do not allow fired bullets or shotshell wads to remain sealed with blood and/or other body fluids in an air tight container.

Gunpowder Examination Evidence

- AIR DRY clothing or other articles submitted for gunpowder pattern examinations.
- Mark each piece of evidence for identification using a tag and attach the tag away from any bullet holes, powder, or blood.
- Place each piece of evidence in separate, sealed PAPER bags. Never use plastic bags to store gunpowder examination evidence.
- Always wear protective latex gloves when handling bloody items. Handle articles carefully, as shaking or brushing may remove evidence.
- Submit only the outermost garment(s) that have been shot. Underlying garments that are completely covered and/or garments that have not been shot should not be submitted.

Tool Mark Evidence

- Whenever possible, collect the item(s) containing the tool mark(s).
- In the case of extremely large or immovable items, either remove that section of the item containing the tool mark or make a cast of the tool mark using Mikrosil, silicone rubber, or other suitable casting material. **Submit any castings in paper or cardboard.**
- Package all tool mark evidence separately. Package the working end of a suspect tool to prevent damage to the working surface and to prevent the loss of possible trace evidence. Do not use tape to cover or protect the end.
- Never touch or fit a suspected tool to a tool mark.
- Never clean a tool or a cast of a tool mark. Submit the evidence, as is, to the Laboratory.
- Never make your own test marks with a suspect tool.
- Mark all containers for identification and make sure they are properly sealed.

Test cartridge cases and evidence cartridge cases for entry into IBIS ONLY

- If dealing with **evidence**, determine if there is a need for other Laboratory analysis to be performed. If so, use the Request for Examination of Physical Evidence form (SBI-5) and follow the submission instructions outlined on that form. NOTE: During routine casework, all fired evidence cartridge cases and all test fired cartridge cases from evidence firearms that meet the caliber requirements and are of matchable quality are entered into IBIS.
- If the **evidence** is being submitted for entry into the IBIS database **only**, indicate in the

space "Examine for IBIS only." Please indicate the actual offense in the "Type of Case" space on the SBI-5.

- Use one SBI-5 form for each case to be submitted.
- When submitting **test** fired cartridge cases for entry into IBIS only, use the SBI-21 IBIS Submission form.
- It is mandatory that the Case #, Incident/Recover Date, and the Description/Remarks sections are completed for each firearm test fired.
- Multiple case submissions of test fires may be made on the SBI-21 form.
- Only centerfire caliber handguns and caliber 7.62 x 39mm and .223 (5.56mm) rifles should be submitted for entry into IBIS. Do not submit rimfire caliber firearms (i.e. caliber 22's), shotguns, or rifles of any other caliber.
- IBIS is state-of-the-art technology. This technology is changing at a rate much faster than procedure manuals may be written and distributed. If you have any questions about the system, contact the State Crime Laboratory Firearm and Tool Mark Section.

Report Interpretation

Firearm Examinations

- **Class Characteristics:** Measurable features of a specimen which indicate a restricted group source. The class characteristics of firearms may include the caliber, the number of lands and grooves, the widths of the lands and grooves, direction of rifling twist, size and type of firing pin, and position and type of extractor and/or ejector.
- **Individual Characteristics:** Imperfections or irregularities produced accidentally during manufacture or caused by use, abuse, corrosion, rust, or damage. Individual characteristics are unique to an object and distinguish it from all other objects.

Bullets, cartridge cases, and shotshells compared to a suspect firearm

- **Positive Result:** The bullet, cartridge case, and/or shotshell was fired from and/or chambered in the suspect firearm. The bullet, cartridge case, and/or shotshell has the same class characteristics as the suspect firearm and sufficient agreement of individual characteristics to make an identification.

- Inconclusive Result: The bullet, cartridge case, and/or shotshell has the same class characteristics as the suspect firearm, but lacks sufficient agreement of individual characteristics or has no discernible individual characteristics thereby preventing the possibility of making a positive identification or elimination.
- Negative Result: The bullet, cartridge case, and/or shotshell was not fired in or from the suspect weapon. The bullet, cartridge case, and/or shotshell has different class characteristics than the suspect firearm.

TOOL MARKS COMPARED TO A SUSPECT TOOL

- Positive Result: The tool mark was made by the suspect tool. The tool mark has the same class characteristics as the suspect tool (e.g., shape, size, manufacturing marks, and so forth) and sufficient agreement of individual characteristics to make an identification.
- Inconclusive Result: The tool mark displays the same class characteristics or some of the class characteristics of the suspect tool, but lacks sufficient agreement of individual characteristics or has no discernible individual characteristics thereby preventing the possibility of making a positive identification or elimination.
- Negative Result: The tool mark was not made by the suspected tool. The tool mark has different class characteristics than the suspect tool.

Firearms Reference Collection

The Firearm and Tool Mark Section maintains a reference collection of firearms confiscated by state and local law enforcement agencies.

Firearms may be submitted to the Firearm and Tool Mark Section Firearms Reference Collection by any law enforcement agency. It is **imperative** that submitted firearms be accompanied by a court order authorizing the State Crime Laboratory Firearm and Tool Mark Section to either (a) maintain the firearm(s) in the reference collection or (b) to destroy firearms serving no useful purpose.